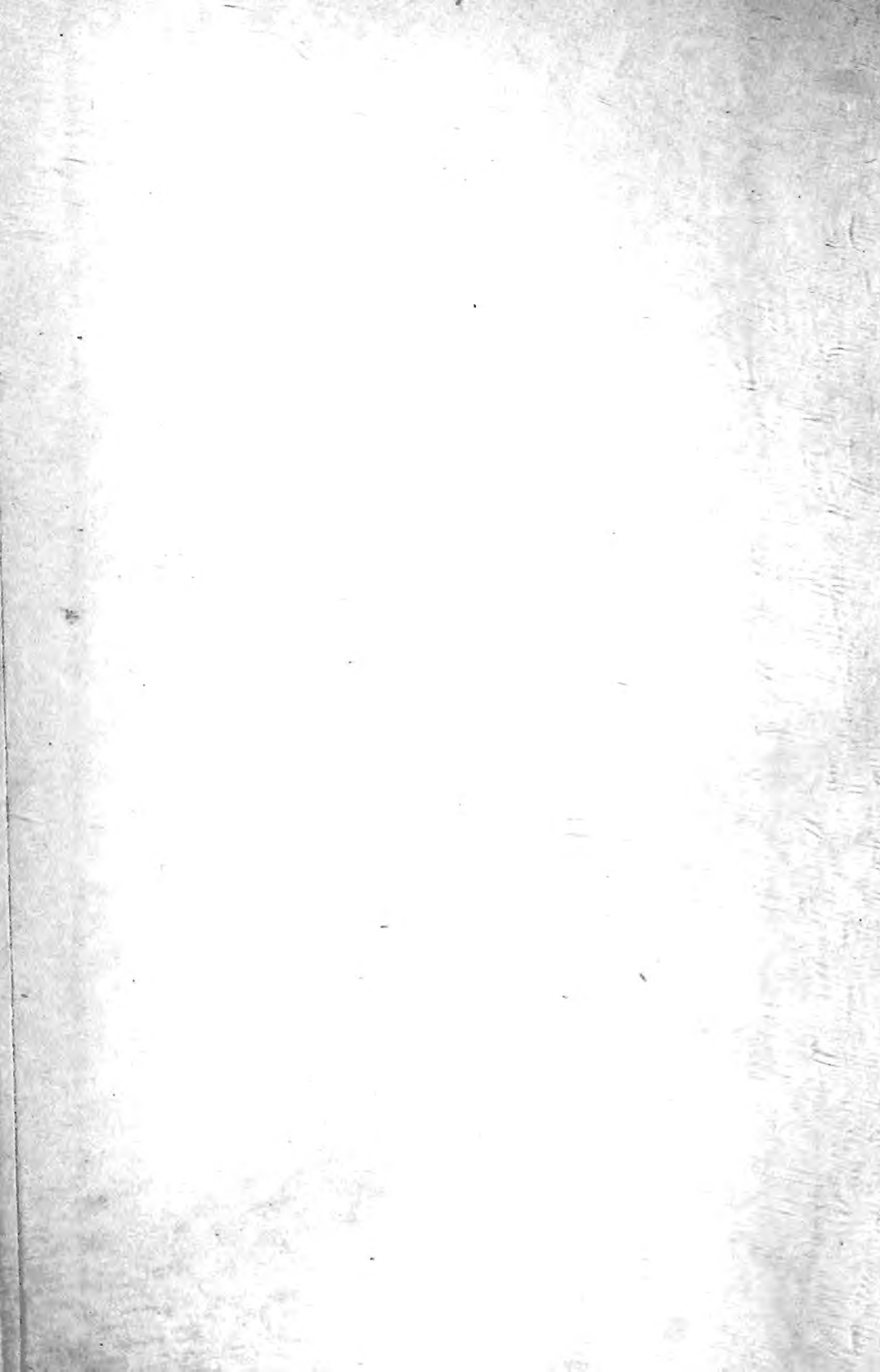


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PREFACE.

ANOTHER year is drawing to a close, and in recalling this fact it becomes the pleasing duty of the Editor to congratulate his contributors on the completion of another volume of 'The Zoologist.'

Through the medium of this Journal during 1881 much good work has been accomplished, much commenced which will doubtless bear fruit in due time. In this latter category may be included the scheme which has been organised for obtaining evidence from the keepers of lighthouses and lightships concerning the arrival and departure of migratory birds on the coasts of England and Scotland. The reports on this subject, which have been already published,* encourage the hope that ere long a satisfactory solution may be found of the many curious questions affecting the subject of the Migration of Birds. In the same category may be placed the excellent chapters by Messrs. Carrington and Lovett on British Stalk-eyed Crustacea, in course of publication, which, we doubt not, will have the effect of popularising a branch of Zoology which has hitherto not found much favour with British naturalists.

On glancing through 'The Zoologist' for 1881, we cannot fail to recognise many other papers which, like those just referred to, are of permanent value, and will be turned to again and again by those seeking information on the subjects of which they treat. Amongst these may be especially noted Mr. Harvie Brown's chapters on the Rarer Animals of Scotland (pp. 8-23, 81-90, 161-171); Professor Schlegel's paper on the habits of the Harvest Mouse (p. 233); Mr. Potts's account of the habits of that singular carnivorous Parrot of New Zealand, the Kea (p. 290); Mr. Norgate's collected observations on the food of Birds (pp. 313-325, 410-413); and Mr. Freke's paper on European Birds observed in North America (pp. 365-378).

Besides these we have two very useful Catalogues of the Mollusca of York and of the Isle of Man, contributed respectively by Mr. R. M. Christy and the Rev. T. Talbot.

2X * See 'The Zoologist' for May, 1880, and October, 1881.

The numerous instances of the occurrence of rare British Vertebrates which have been recorded in the pages of this Journal during 1881 afford evidence of the increased attention which is being paid throughout the country to the study of Natural History, and to outdoor observation of the habits of animals.

Indeed the number and importance of these records, extending as they now do through thirty-nine volumes of 'The Zoologist,' have long suggested to the Editor the desirability of preparing for publication a General Index. The utility of such a publication, it is believed, would be undisputed, but as its preparation would be attended with considerable labour and expense, it is not a work to be hastily undertaken.

Assuming that a General Index might be produced at a cost to subscribers of 20s., it is perhaps not unreasonable to suppose that a sufficient number of copies would be taken to pay expenses. On this point Mr. Newman, the proprietor of 'The Zoologist,' would be glad to receive assurances of support; he would be ready to undertake such an Index if about 200 copies were subscribed for. The Index, compiled on the lines of the annual Index, but with additional references (especially to counties and localities), and made to accord as nearly as may be with the rules of the Index Society, would (if printed in small type) extend to about the size of the present annual volume.

The Editor would welcome any hints or suggestions from contributors as to the form which in their opinion the Index should assume, for he feels that he cannot do better than consult the views of those for whose use and benefit the Index is intended.

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ON THE HABITS AND MIGRATION OF THE SNOW BUNTING.

By JOHN CORDEAUX.

THE plate which illustrates this paper, drawn and kindly contributed by Mr. Charles Whymper, represents the nest and eggs of the Snow Bunting, and is a relic of the adventurous journey undertaken by his brother, Mr. Edward Whymper, who in the spring and summer of 1874 endeavoured to explore some portion of Greenland, with the hope of determining the character of the interior of that ice-burdened land.

Professor Newton, in his admirable and concise notice of this species (Yarrell's 'British Birds,' 4th edition, vol. ii., pp. 1—14), thus describes the nest:—"A rude collection of dry grass, moss or any other plants that may be growing near, forms the foundation and outworks of the nest. This is hollowed out to receive a quantity of finer grass and roots substantially woven into a bowl, which will occasionally bear removal from the outer mass without losing its shape, and is lined with hair or soft feathers—especially those of the Ptarmigan of the country. Herein are laid the eggs, from four to six or even eight in number, measuring from '91 to '82 by from '65 to '57 in. They are white, more or less tinged with pale greenish blue, on which are patches of lilac, sometimes very bright, but generally dull, the whole closely or sparingly spotted, streaked and splashed with deep brownish red, upon which again are frequently a few apparently black spots and irregular lines. Some eggs when fresh are of exceeding and almost indescribable beauty."

Dr. Elliott Coues, in his report on the Ornithology of the Prybilov,* near the middle of Behring's Sea, and off the coast of Alaska, says that the Snow Bunting, or Snow-bird, is a permanent resident on the islands, nesting high on the rocky broken uplands, and only entering the villages during unusually severe or protracted cold weather. "It builds an elegant nest of soft dry grass, and lines it warmly with a thick bed of feathers, placing it on the ground generally beneath some lava-slate, or at the foot of a boulder." The eggs he describes as usually five in number.

Professor Newton, in the article above quoted, has collected a great mass of evidence proving undoubtedly that the southern breeding range of the Snow Bunting extends as far south as the Grampians, old birds in summer, and the young in the autumn, having frequently been observed on some of the highest Ptarmigan hills in Scotland, and it is rather surprising that on the mainland the nest should have hitherto escaped detection.

There is no doubt that a few pairs breed regularly in Shetland, and the late lamented Dr. Saxby, whose early death every reader of this journal must regret, states ('Birds of Shetland,' p. 94) that twice he had the nest and eggs brought to him; once in July, 1861, found in a crevice of the rock near the top of one of the high sea-cliffs at Burrafirth, below the hill of Saxaford; and again, in 1871, a man who used to collect for him brought, as a present, a Snow Bunting's nest and four eggs, found amongst the stones of the demolished cairn at Saxaford the summer before. These two, so far as I am aware, are the only instances of the Snow Bunting's nest being found in the British Isles.

Northward of Great Britain it nests regularly in the Færoes, in Norway, on the northern islands of the coast, as well as on the high fells of the interior. In Iceland it is the commonest of the smaller birds, and in Spitsbergen, as Prof. Newton says, is the only Passerine bird which is ordinarily met with. Northward still it finds a congenial home on Kaiser Franz Joseph Land and on many a barren island in the ice-encumbered northern seas, and doubtless also on undiscovered lands nearer to the Pole, as yet untrodden by human footsteps.

Considering the position in which the nest is placed, under some boulder or ledge of rock, it is not surprising that it should

* 'The Fauna of the Prybilov Islands,' by Dr. Elliott Coues, ed. J. E. Harting, p. 17 (1875).

so rarely be discovered. Mr. Wheelwright ('A Spring and Summer in Lapland'), says he always found it higher up the fells than the Shore Lark, but never succeeded in discovering the nest. The wildest and most desolate spots on these Arctic fells were the haunt of the little Snow-flake; miles of broken ground, covered with nothing but loose shingly slate and ironstone, and scattered boulders of erratic rock. No wonder, then, that the nest is so difficult to discover.

The nest has also occasionally been found amidst the great masses of drift-wood, river-borne, cast by currents on the Polar shores, containing perchance relics of stout-ribbed ships lost in the whale fishery, or of such as have failed, striving nobly to the end, to find the great white gate leading to the Pole. Strangest of all places for nesting, Captain Lyons relates how, on the barren coast of an Arctic island, he found the nest of a Snow Bunting in a shallow grave within the bleached skeleton of an Eskimo child.

It appears that the breeding quarters of this species extend from near the Pole as far south as latitude $56^{\circ} 40'$ North in the British Isles, and are restricted less by the latitude than elevation above sea-level. Like the Ptarmigan, the feathers of which are so frequently found in its nest, it lingers still on the summits of the highest mountains in North Britain, amongst the dwarf-willow and snow-saxifrage, and many a bonny Arctic plant, last relics of that old fauna and flora which in the glacial period extended, with the Lapp, Reindeer, and Snowy Owl, even to the blue waters of the Mediterranean.

Notwithstanding the high latitudes in which the Snow Bunting nests, it is by no means a late breeder. Capt. Feilden found it nesting plentifully in the neighbourhood of Godhavn in the second week in July, in one case with the young nearly ready to fly. In Novaja Zemlia, Th. Von Heuglin states ('Ibis,' 1872, p. 61), it is everywhere abundant; he found newly-fledged young at the beginning of August, at which time there were still birds unable to fly; he says that the autumnal moult of the old ones occurs at the end of August, and the southern migration commences about the middle of September. Capt. Feilden remarks that, on the return of the last Polar Expedition under Capt. Nares, when near lat. $73^{\circ} 40'$ N., on September 18th, flocks of Snow Buntings were seen migrating to the south. In 1874 Mr. Seebohm found them breeding on the island of Vadso in the Varanger Fjord, but was

too late for the eggs; the young were already in the nest by the middle of June.

The migratory flocks do not, as a rule, arrive on our English coast before the end of October or early in November. Their abundance or otherwise seems partly regulated by the character of the season. In mild winters we have few, but in severe winters they are often very abundant, single flocks alone containing many thousands. By the middle of October I have generally found a few beautiful old males* on the Holderness coast. The high cliffs north of Easington, as well as those lower ones near Kilnsea, and Spurn Point itself, are very favourite haunts of the Snow Bunting on its first coming.†

Dimlington "highland," some miles north of Spurn, at its greatest height is 146 feet.‡ The perishable nature of these cliffs, as well as the rapid and increasing encroachments of the North Sea, are here clearly demonstrated. From a few feet below the summit the cliff slopes away in an enormous talus—a mass of piled-up ruin, cast down under the combined influences of frost and rain. Great masses from the top, many yards in width, are constantly slipping seawards and adding to the ruin. Here in October I have sometimes seen a solitary Snow Bunting which has come in long before his fellows, flitting from one point to another of the broken cliff—beautiful old birds, in that lovely transitional

* These solitary birds arriving before the regular migration are invariably old males, and any early-killed Snow Bunting recorded may, without doubt, be put down as an old male. In Heligoland Mr. Gütke remarks, "Snow Buntings turn up here occasionally as early as the latter half of August, but these are invariably young."

† If the number of Snow Buntings appearing on our east coast is to be taken as an indication of a severe winter, this of 1880-81 should be a severe one. To-day (November 24th) I have seen an immense number, thousands and thousands, on stubble and grass alike; all appear to be young birds of the year and females, not half-a-dozen old males.

‡ Dimlington heights are the most prominent land on approaching the otherwise flat shores of the Humber, and naturally attract migrants on their first arrival. They are a favourite resting-place of the Rough-legged Buzzard and other large Raptores in their wanderings. Prof. Phillips ('Rivers, Mountains, and Sea-coast of Yorkshire') calculates the annual waste of the Holderness coast from Spurn to Flamborough as equal to $2\frac{1}{2}$ yards per year along its entire length, so that one mile in breadth has been lost since the Norman Conquest, two miles since the Roman Invasion. My own experience would now put the annual waste at much more than this, especially for some miles north of Spurn.

dress from summer to winter, the head washed with fawn-colour, and each black feather on the back, between the scapulars, edged with a fringe of brownish white. Often, too, may be seen an old bird or two on the beach at Spurn Point, searching the tide-wrack for insects, their presence only made apparent by the white flicker of wings as they shift their ground.

The first flocks, when they arrive early in November, consist mainly of the young of the year and a few females, rarely any old males. No two birds are exactly alike; and, when observed with a good glass at close range, each individual has a very curious appearance, as if the colours are laid on in stripes from the head to the tail, like the painted birds in a "Noah's Ark." Sometimes, with an increase or sudden outburst of very severe weather in Northern Europe later in the winter, a second migration of Snow Buntings is not infrequent; these are mainly old birds, or contain a much larger proportion of old birds than are seen in the earlier immigrations, and doubtless are Snow Buntings which would never have come to us were it not for some strong impelling cause, as an advent of intensely severe weather on the Continent, exactly as such weather early in the year will cause a sudden influx of old Fieldfares and Blackbirds with yellow bills.

On their first arrival Snow Buntings feed mainly on the seeds of such salt-loving plants as *Schoberia maritima* and *Glaux maritima*, and others; later, when dispersed over the marshes, they feed on the seeds of various field weeds and grasses. No small bird which frequents our bleak and inhospitable marshes is capable of withstanding such severe cold; for long after all other birds have been driven into the stack-yards, we hear their cheerful chirrup, and can watch them coursing over the hard frozen snow and picking the seeds from the withered bents which rise above the otherwise universal white. As a rule, they prefer the neighbourhood of the coast, but I have occasionally seen flocks on the "wolds" some distance inland; and Mr. William Eagle Clarke informs me that in the severe winter of 1878-79 a large flock came quite into the borough of Leeds, frequenting some rough ground adjoining one of the busiest manufacturing portions of the town.

Examine them when we will, we rarely find a Snow Bunting anything but plump and fat, and under certain emergencies they are not to be despised on the table. Dr. Saxby narrates (Zool. 1871, p. 2535) that when, from the non-arrival of the

ships, provisions were scarce, a dish of fat Snow Buntings became not only an agreeable change, but an actual necessity. Messrs. Seeböhm and J. A. Harvie-Brown ('Ibis,' 1876, p. 118) state that in the neighbourhood of Ust-Zylma, on the Petchora river, in spring, great numbers are taken by the boys in horse-hair nooses, and are sold 100 for half a rouble, and very good eating they are. Towards the beginning of April they saw large flocks feeding on the great manure heaps by the side of the river Mezen, close to the town of that name.

In its summer haunts the Snow Bunting feeds much on the buds of *Saxifraga oppositifolia*, and the larvæ of midges and mosquitoes, collected from the many little shallow pools where they undergo their metamorphoses, as those who have spent June and July in high latitudes have discovered to their cost. It is said that Snow Buntings do not perch on trees or bushes; they commonly do this both in North America in the winter and in Northern Europe during the summer.* Of late years I have seen small flocks fly from the "fitties" on the Lincolnshire coast, and crossing the embankment alight on the top of one of those tall shelter-hedges so frequent in the marshes. They are also very fond of perching on any slight eminence, such as a stone or sod, and it is not uncommon to see a newly-sown field of corn with a bird perched on each prominent clod.

Snow Buntings leave us late in February or early in March, and in North-East Lincolnshire I have not seen them later than the 21st of this month,† at which time the old males had the dark feathers on the back, but edged with brownish grey. The local name of this species on the east coast is "Norway Sparrow," also "Snow-bird" and "Snowflake." The Danish name is "Snefugle," and by the Eskimo it is called "Trapaluarsak."

There appear to be two, if not three, races or varieties of this species, the American and Greenland bird, not specifically distinct from the European, but differing in being larger and more stoutly built. It is quite possible that examples of this larger race may occur occasionally in Europe. Somewhere, we know, in regions near the Pole, the summer homes of the two races must

* See 'Siberia in Europe,' by H. Seeböhm, 1880, p. 37.

† Mr. St. John ('Nat. Hist. & Sport in Moray,' p. 281) says, "They leave us late, some remaining to the first week in May." These, however, may be birds which nest in Scotland, retiring in May from the coast to the interior.

meet, if they do not overlap, and it is reasonable to suppose that flocks of either may travel southward in the autumn migration into either continent. Our common European bird appears to be intermediate in size between this and a smaller race, which in Heligoland, as Mr. Gätke has informed me, arrives later than the other; he has only once obtained a fine and perfect adult specimen. These are not only smaller, but lighter in colour; the rusty edges of the upper parts are not so brown as with the bigger ones, which holds good throughout all ages. Mr. Gätke further remarks, "Snow Buntings have of late years decreased here very markedly, and really old birds with white wings, except the black feathers of the thumb, are very rare, perhaps one in a hundred; so are the small race." Mr. Gätke's examples of these two races, which I have seen in his Heligoland collection, certainly exhibit a very marked difference in size.

The little "Snow-flake" has the pre-eminence of having been seen nearer the Pole than any other species. Capt. Markham relates how, on the return journey of the sledge party despatched in the spring of 1876, in the direction of the North Pole, at a time of great suffering, when the exhausted men were in the grasp of their deadly foe, the scurvy, a Snow Bunting one day appeared on a neighbouring hummock on that vast and dreary Palæocrystic sea, and encouraged them to fresh exertions by its cheerful chirrup.

To the lover of birds dwelling on the east coast there is no greater favourite than our "Snowflake," for it comes when summer birds are gone, in the darkness of the declining year, enlivening the bleak coast or marsh with its cheerful call, and making beautiful the dreary landscape by the flicker of hundreds of white-patched wings; so that, seen against the dark background of a lowering sky—which in itself causes the dark portions of the plumage to become invisible—it has exactly the appearance of those large feather-like and slowly-drifting flakes which herald the approaching storm. How much more a favourite should it be to those who have watched it in its summer haunts, in the sheltered quiet of some Greenland valley, strewn with the yellow flowers of the little Arctic poppy, or crimson with blossoms of *Silene acaulis*, that most lovely of northern plants, and there listened to the sweet song of the male, trilled out under the midnight sun, as, perched on some lichen-spotted boulder or sprig of Arctic willow, he serenades in her dark cell his brooding mate.

THE PAST AND PRESENT DISTRIBUTION OF SOME OF THE RARER ANIMALS OF SCOTLAND.

BY J. A. HARVIE-BROWN, F.Z.S.

I. THE WILD CAT.

It has been truly remarked that "the exterminating process is generally one that excites little or no attention until the doom of the victim is sealed."* Thus we find that, although much has been done in collecting and publishing records connected with our now extinct species, such as, for example, the Great Auk† and the Wolf, not to speak of the more remote Beaver, Boar, Bear, and many others,‡ comparatively little attention has been paid to the animals which, though not extinct, yet in this country are on the fair way of becoming so.

For some time past I have accumulated statistics concerning the occurrence of several of our rarer indigenous Scottish mammals and birds, many of which, though formerly abundant and widely dispersed, have, in comparatively recent times, disappeared from certain districts and localities, retreating to the wilder and less accessible portions of the country, before the adverse circumstances which have been gradually surrounding them. Confining my investigations to Scotland, for the most part, I have taken up this subject in the hope of saving from oblivion such anecdotes and statistics as I have been able to collect, independently of already published records in easily available works of reference.

One thing should be borne in mind in such enquiries as the present, *viz.*, if ordinary care be taken to collect statistics from as many neighbouring districts as possible, a fairly accurate idea must be obtained of the latest occurrences of our rarer *Carnivoræ*. Great as distances are in the Highlands, the proverbial "bittock" lengthening out to miles, news travels fleetly, and especially any

* A. Newton, "The Gare-fowl and its Historians," *Nat. Hist. Review*, 1865, p. 467.

† For the history of this extinct species in Scotland see the above-cited article, and, besides other minor papers, those by Mr. Robert Gray, 'Birds of the West of Scotland,' and Dr. J. A. Smith, 'Remains of the Great Auk, *Alca impennis*, in Caithness' (*Proc. Royal Antiquarian Soc. Edinb.*, vol. xiii., New Series, I., 1878-9), where most of the information regarding it will be found.

‡ See J. E. Harting, 'Extinct British Animals.' Trübner & Co. 1880.

news connected with the chase, or with Foxes, Cats, or other vermin.* I have taken considerable care to include as many available districts as possible, and have been most careful and minute in my inquiries in these parts where the animals have become extinct, because I have deemed it desirable to record such minutiae so long as they are available; but where there is no immediate prospect of the different species becoming extinct I have thought it better to withhold my information for the present lest, by publishing it, the extinction which we deplore may be hastened.

Generally throughout my work I have been greatly assisted by many kind friends and correspondents in all parts of the country, who have always cheerfully replied to my enquiries, and it has been a pleasure to me to observe that an increasing interest is being taken in the natural history of our indigenous animals. I cannot now express more fully my sense of indebtedness to them, but may entertain the hope that they will continue to favour me with their communications.

In my treatment of the subject I have been obliged to condense the material I received as much as possible, and have therefore seldom given my direct authorities for the statements in the text; but when I say that every item of information, with exact, or approximate, dates, is carefully preserved *in extenso* in my notebooks, and that each party who has supplied information will, upon reading this paper, be able to identify those items which he has himself supplied, I think enough is said as regards the authenticity of the statistics. At the same time I have in many cases taken pains to verify the accounts which have reached me, and I have included none which I have had good reason to doubt, or which appeared to me to be incomplete.

The Wild Cat, *Felis catus*, has never been a native of the Islands of Scotland, if we may judge from its entire absence from them at the present time, as well as that of certain other mammals, the early arrival of which, along with the present species, appears to have taken place at a comparatively recent date, namely, since

* Thus a single individual—we will say a forester on a great deer forest, such as Athole or Breadalbane—in most cases is able to tell exactly or approximately the date of the last one killed, not only on his own beat, but perhaps on the beats of all his brother foresters and keepers for miles around.

the separation of the Orkney Islands from the mainland;* but its distribution over the mainland of Scotland at a time not very remote, must have been general, as we find records of it from the Border counties northward to Cape Wrath and Caithness. Pennant was probably in error when he assigned it a place amongst the mammals of Arran. From all the evidence at command it appears to have retreated northward from the southern counties, and to the wilder and more mountainous portions of the Highlands from the lower lying and more cultivated districts, finally finding refuge only in the deer-forests and larger extents of moorland where it has been least subjected to persecution.

Mr. Alston, in his latest remarks (*op. cit.*), says, "I believe that none now exist south of the northern districts of Argyll and Perthshire;" and from localities south of the limit indicated, I certainly find most difficulty in collecting any data, except such as has already been recorded by other writers.

Beginning in the south of the country and proceeding northwards, I propose first to treat of the localities or districts in which it has become extinct, recording, as far as materials permit, the approximate dates and circumstances of the last specimens killed, and any traditions connected with its former abundance, avoiding, however, as far as possible, tedious repetition of already existing records, except in so far as is necessary for the continuity of this paper. As I reach farther northward, to the districts where it is still far from approaching actual extinction, I will select from my notes and correspondence such particulars of its distribution, incidents of captures, &c., as may prove most interesting to the general reader, but will avoid going into details, which, however important and interesting after a species becomes extinct, it is

* See Alston, 'Fauna of Scotland' (Mammalia), in the series published by the Natural History Society of Glasgow, 1880. I have statements from correspondents of the occurrence of the Wild Cat in the Isle of Skye, but the evidence is too conflicting to justify any faith whatever in the presence of the true Wild Cat there. It has, I believe, never been known there, and large specimens of the tabby run wild have been recorded as true Wild Cats. One weighing between thirty and forty pounds, according to a correspondent, for a long period adorned the hall of Kirkibost House, but is not now forthcoming. The "small species of Wild Cat" of the 'Old Statistical Account' (1793, vol. viii. p. 51), inhabiting the islands of Gigha and Cara, and living on rabbits, is, of course, the crofters' tame cat run wild.

hardly desirable to make too prominent before extinction takes place.

It will be seen from the following remarks that the Wild Cat is now extinct throughout a large portion of Scotland—*viz.*, all south and east of a line commencing, roughly speaking, at Oban, in Argyleshire, passing up the Brander Pass to Dalmally, following the boundary of Perthshire, and including Rannoch Moor; continued north-westward to the junction of the three counties of Perth, Forfar and Aberdeen; thence across the sources of the Dee northward to Tomintoul, in Banffshire; and, lastly, from Tomintoul to the city of Inverness. Northward and westward of this line the animal still keeps a footing in most suitable localities, finding its principal shelter in the great deer-forests. Throughout the still-inhabited area there are many large extents of apparently suitable country where it is very scarce, and where it would soon become extinct were these tracts not at intervals replenished from the increase in the above-named sanctuaries. Thus the low-lying country in the east of Rosshire and the Black Isle of Cromarty, and certain parts of Caithness and Sutherland, have long been quite, or almost, unfrequented by them. They travel, however, long distances, as is evident from their tracks in snow and other signs constantly brought before the notice of foresters, shepherds, fox-hunters, and gamekeepers, who are well acquainted with their habits and haunts. A very considerable district may be thus tenantless for a number of years, and they may suddenly reappear at haunts long since believed to have been deserted for ever. They naturally choose the cairns most suitable for their harbourage on arrival in a new country; and thus cairns long ago known as the favourite haunts of the species, are rediscovered and reoccupied. Here also the great use of the study of topography and the names of localities is evident, if one desires to form a correct notion of the early distribution of many species.

Information derived from Mr. Alston's correspondence with Mr. A. H. Cocks and others confirms the above general remarks. The following extract from a letter by Mr. A. H. Cocks, dated March 7th, 1879, to Mr. Alston, shows the present distribution of the species from another point of view:—

“The Wild Cat,” he says, “appears still to occur over the whole counties of Sutherland, Ross and Cromarty. I have not heard of it in Caithness, but although the north end of that county

is lowland, its range is pretty sure to overlap the S.W. border; also through the greater part of Invernesshire, but not, I think, in the east-central part of the county—i. e., the neighbourhood of the Spey. I suppose it still exists in parts of Argyleshire, and in the S.W. corner of Aberdeenshire (Braemar district), but cannot personally answer for either county. It has disappeared long since from the Lower Speyside (Moray and Banff), and although it may cross the northern border of Perthshire, it certainly does not penetrate very far into that county."

Having thus sketched the general boundary lines of its present domains, I proceed under each county,—commencing in the South of Scotland,—to endeavour to trace the steps of its retrogression and dates of its extinction.

Berwickshire and the Border Counties.—Mr. James Hardy, of Old Cambus, has exhausted the subject as regards Berwickshire and the Border Counties, in two papers contributed by him to the 'Proceedings of the Berw. Nat. Club' (vol. iii., pp. 357-59; vol. vii., pp. 246-50 (1874); and vol. ix., p. 15). He himself saw the last on record on the 17th March, 1849, near the Swallow Craig, not far from Old Cambus, on the coast of Berwickshire, where his father, more than forty years ago, "used to see them when they were still numerous." Mr. Hardy also mentions numerous other localities in the county of Berwick frequented by Wild Cats within the memory of people still or lately living.* In the second of his communications Mr. Hardy gives still further proof of its former occurrence, and refers to recent correspondence in the 'Kelso Chronicle,' where he gives other evidence of its having been familiar to the country people. Evidence is also adduced from the names of many localities,† showing that they have formerly been associated with the native Wild Cat. Some of these are, "Wulcat Yett," near Jedburgh; "Cat-lee-burn," in Southdean; "Cat-cleugh," in Liddesdale; and others, both on the Scottish and English sides of the Border. We may remark here, while on the subject of topography, that names of localities occur, either in Scotch or Gaelic, called after

* *E. g.*, "Coves" on the coast between Old Cambus and Fast Castle; Windylaw Cove; the woods above Pease Bridge; Penmanshiel Wood; near Blackie, &c.

† Ogle Burn; at The Sling, near the head of the Monynut Burn, there was a colony above forty years ago; Keilder, &c. (*op. cit.*)

the species, in almost every county of the mainland of Scotland, indicating a wide range before they began to decline; and they were so common that they were considered as animals of the chase, and sportsmen sallied out for their destruction (Fennel, 'Field Naturalist,' 1834, p. 191). Some of these localities, however, are thus named, not after the Wild Cat proper, but after the Marten-cat, and it is now next to impossible to decide, in every case, which of the two species suggested the name. It is to be hoped that before long the results of close attention devoted to this most interesting branch of study—topography—by an able Gaelic scholar, will throw considerable light upon the former distribution of many of our indigenous animals.

Dumfriesshire, Kirkcudbright, Wigton.—Examining into the authenticity of the traditional last-killed Wild Cat, which is reported to have been obtained at Mabie by a keeper named Cameron, I find that it is not authentic. The specimen has been in the Observatory Museum, Dumfries, for somewhere about thirty-four years, and on close inspection proves to be only, as Mr. Service neatly expresses it, an unusually "fiercely-stuffed specimen" of the common tabby. There are other traditions of Wild Cats in the Stewartry, and we certainly believe that they are not all purely mythical, though it is difficult to authenticate each statement. All, however, appear to agree in this, that no true Wild Cats have been known to exist in the district for more than fifty years. On the other hand, many agree that true Wild Cats were not uncommon at one time. Mr. John M'Kie, of Anchorlee, writes to Mr. Service that they were common on the Souwick shore about the beginning of the century. It was related to Mr. M'Kie, when a boy, by a native of the parish of Borgue, named James M'Taggart, that he saw two fox-hounds belonging to "Alexander," the county huntsman, so torn by one or more Wild Cats near the cliffs at Souwick Glebe, that they had to be destroyed; and that ever afterwards Alexander avoided the place when hunting. "And," continues Mr. M'Kie, "even in my own recollection, it was with considerable doubt that we approached the place when out birdsnesting." The same person told Mr. M'Kie that the last of the breed was killed by a man named Beck, then farmer in Balmaangan; but Mr. M'Kie does not remember the exact date, "but it must have been sixty or seventy years ago," say 1810 or 1820. These traditionary records are worth preserving,

though necessarily incomplete. Beyond these records, the memory of the Wild Cat in the Stewartry only lives in the names of places,—of which, however, a good many bear evidence of its former presence, such as “Wild Cat Craigs,” “Wild Cat Wood,” &c.,—having regard, however, to what has already been said of these names. Dr. Grierson, of Thornhill, writes me there are certain traditions in his neighbourhood of its former occurrence, but he is of opinion that none of these can be relied upon.

Other Counties in South of Scotland.—All the evidence shows that it is long since the Wild Cat became extinct in the counties south of the Firths of Forth and Clyde—so long, indeed, that it seems impossible to collect anything but negative evidence, or the evidence which may be considered as existing in names of places called after the species. Thus it will be seen that it has retreated from the greater part of South Scotland, and has lingered longest in the most mountainous districts. Parallel facts with regard to the gradual disappearance of the Marten in the South of Scotland will show that these appear to be the directions of the retreat of more species of indigenous *Carnivoræ* than one, and a study of the decrease and extinction of the Squirrel in the South of Scotland points to similar, or somewhat similar, results. While the central counties of S. Scotland have been longest deserted, the Cheviots, and the counties north of the Firths of Forth and Clyde have afforded longer harbourage to these and probably to other species. They have retreated southwards, on the one hand, to the range of Cheviots, and northwards, on the other, to the wilder country beyond the Firths of Forth and Clyde.

Dumbarton.—Passing now to the counties north of the Firth of Clyde, Mr. John Colquhoun informs me that the last-killed in Dumbarton was in 1857, by Archibald M'Donald, gamekeeper to the late Sir James Colquhoun, Bart., of Luss. It was killed on Rossdhu Property, and not one has been seen since. Another, trapped also at Rossdhu, is in the collection at Rossdhu House. Mr. J. Colquhoun tells me they were plentiful in the county in the beginning of the present century, and he has perfect recollection of hunting them regularly when a boy.

Stirlingshire.—A Wild Cat is recorded by Macgillivray as having been killed in the county; this was, of course, prior to 1830, the date at which he wrote (*Nat. Library, Brit. Mam., p. 193*). The *‘New Statistical Account’* (Stirlingshire, p. 75) records them

as extinct in 1842 in Fintry and Campsie parishes, but as still existing in Strathblane, but such a statement is open to considerable doubt. Two Wild Cats were presented to the Hunterian Museum in Glasgow by the late Duke of Montrose, which were killed on his property, and these are still in the said collection. Mr. John Young informs me that there are no documents nor information in the Museum throwing any light upon the date when they were sent there. "I should say," continues Mr. Young, "that they must have been sent some forty or fifty years ago. I have been here some twenty-one years, and when I came to the Museum they looked nearly as old skins as they do now." "Cat Craig" and "Catscleugh," near Denny, may, amongst other names of places, indicate its former presence.

Clackmannan and South Perth (isolated), Fife and Kinross.—Information from Kinross is entirely negative, and no records have been kept of the last killed, so far as I have been able to ascertain.

Perthshire.—The Wild Cat, formerly abundant throughout this county, has now become extremely rare, if not altogether extinct, except in the most remote and mountainous districts. Throughout the whole of the county south of a line drawn from the Firth of Tay through Perth, and thence to Loch Earn and Tyndrum, it must be considered extinct. One was killed at Dupplin Castle about 1852 by Mr. William Pitcaithley, jun., at Irvine Cottage. The last killed in the district south of Glen Dochart was by Malcolm Macpherson, upon Ben More, near Suie, in 1863 or 1864. It has been extinct for quite thirty years in the Valley of the Allan, and between Perth and Stirling. One was killed about that time (say 1850) on the East Hill at Gleneagles, by Mr. Anderson, gamekeeper; it was worried by his dogs. The last obtained in the Callander district was trapped in, or about, 1857, in the Glen of Leny, and is now preserved in the hall of Leny House. Another was seen by Mr. J. B. Hamilton, of Leny, about 1827 or 1828, which was killed in the same place. The keeper on Balquhiddier "killed Wild Cats, amongst other vermin, about twenty-five years ago (say 1855), but they are extinct now." None have occurred for many years on the Braes of Doune, and it appears to be unknown in the Methven, Crieff, and Lyndoch district. For more than forty years none have been seen around Blairgany, in the Callander district. At Cromlix, Braes of Doune, the last

obtained was trapped by Mr. J. MacNaughten upwards of twenty years ago (say 1858 or 1857); it was taken in Cambushinnie Wood, adjoining Cromlix, and was killed by a blow of a rabbit-spade. Two were killed in the west of the county, near Aberfoil, one by a keeper named Scott, the other by a shepherd and his dogs, about the year 1855.* Going a little farther north, and taking in another belt of Perthshire south of a line drawn east and west through Loch Rannoch and Killiecrankie, including the Moor of Rannoch, up to the confines of the county and the march of Argyleshire, and the head of Glencoe, we make out the species to be extinct in Breadalbane, Athole, and the district indicated, unless, indeed, the record that in 1879 one (a young female) was killed within four miles of Dunkeld, and that the tracks of another larger (and doubtless older) specimen were seen in the snow about the same time, can be held to affirm its non-extinction. Previous to this capture, which was accomplished by two shepherd-dogs, no specimen of the true Wild Cat had been secured for fourteen years (say 1865) in this district. Close to the boundary of our last belt of Perthshire—*viz.*, on the north of the line drawn through Loch Earn (*ut. sup.*)—the last killed thereabouts was at Dunira, about twenty-six years ago (say 1854), as I am informed by Mr. Duncan MacGregor, now twenty-two years gamekeeper in Glenartney. "This was at a place called Scarnach Vhor, or Big Carn. It is right behind the present Mansion House, on the face of the hill overlooking the Policies, and the capture took place under the following circumstances:—The keepers, in their rambles, noticed that foxes were frequenting the carns, and set traps in all the available places among the stones. Next morning, to their great surprise, a large-sized Wild Cat was caught. No one knew whence he had come, because not so much as a track had been seen on the snow for years previously, and none had been seen since." One was killed in 1869 in Finlarig Woods by Duncan Dewar, now gamekeeper at Remony; it was a very large female, and is now in his collection. Another was killed, also by Mr. Dewar, above Auchumore House, in 1856, in a deep glen; it was a very large

* In a recently published popular work of great merit, as regards the beautiful illustrations—*viz.*, 'Picturesque Europe'—occurs the statement that "On Ben Venue is the Coir nan Uriskin, or Cave of the Goblin's Cairn, which shelters Wild Cats and Badgers." As regards Wild Cats, however, the verb must now be used in the past tense.

male, which was sent to the late Marquis. It was a noble animal, and, as Mr. Dewar relates, easily knocked over his terrier with each stroke of its paw, and turned twice upon himself when he went to save his terrier. In 1836 three were killed by Peter Mackay, gamekeeper, who is still alive, on the hill above Taymouth Castle. It is believed to have been extinct in Glen Lyon for more than forty years. In Rannoch, also, it is probably extinct. The last killed at Dunalastair, on the river Tummel, was about the year 1852. A little farther south, on Glen Queich Moor, one was trapped in Glen Lochan, above Loch Vullein, in the Amulree district, about thirty years ago, by a keeper employed by Guthrie, the well-known head-gamekeeper at Taymouth. This would be about 1850, and none have been seen or heard of since in that district. They are extinct, also, in Glen Shee, in the east of Perthshire, the last having been trapped at Dalnaglar, about eleven or twelve years ago (say 1869 or 1870). Another is recorded as having been killed in Glen Queich, about forty years ago (say 1840) by a farmer and his dogs. The tussle was a hard one, and only under favourable circumstances could such a capture have been made. Wild Cats existed about 1842, and till a later date, on Loch Erroch side, and Mr. D. MacGregor, now deceased, could remember the young calling in the Black Wood of Rannoch when they were being fed. The general information supplied by one of my correspondents—*viz.*, that since he “took an interest in Natural History (now somewhat over twenty years) he cannot remember ever seeing or having heard of one being captured in the county of Perth”—pretty accurately fixes the date at which they became really rare there, and it will be seen that I have only succeeded in obtaining record of three instances since that time. My correspondent further adds that during that time, “the so-called ‘Wild Cats’ which were shot or trapped proved on close examination to be domestic cats which had taken to the woods.” In these three instances, however, there is good reason to believe the genuineness of the records.

Argyleshire.—Though not extinct in this county, it has receded to the more remote and mountainous districts. It is still found not uncommonly in several districts, occasionally in Sunart, Ardgowder and Morven, and Lochiel, and perhaps Ardnamurchan; also in the northern parts which are separated from Invernesshire by Loch Leven, in the upper parts by Glencreran and Glen Duror.

The last Wild Cat seen in the district around Loch Awe was near Kilchurn Castle, where one was trapped by Donald M'Kercher, gamekeeper to the Earl of Breadalbane, in Letter Wood, about 1864; it is said to have measured three feet eleven inches from the nose to the tip of the tail! I heard of one trapped also at Inverary Castle, about 1828, by Mr. George Brand, when keeper there, who tracked it for several miles in snow. In Ardnamurchan it is difficult to say if it is really extinct, as wanderers from Sunart and adjoining districts may still occasionally turn up. Be that as it may, three Wild Cats were seen in 1871, crossing from Sunart into Ardnamurchan. Two of these were trapped afterwards by Mr. Simon Ross, gamekeeper, in April, 1872, near Glenborrodale, and the third was killed further west by John Cameron, the other keeper, in June of the same year. None have been seen or heard of since. The proprietor informs me they have never been numerous since he first knew the place, in 1856, and probably not more than eight or nine have been killed on it altogether since that time. In Lochiel it has long been the practice to keep down the vermin, a clause being inserted in all Lochiel's leases binding his tenants to pay the fox-hunter for killing vermin, amongst which Wild Cats are named; and many leases of Highland estates bear similar testimony to their presence, or the necessity of preventing them becoming too numerous. In Sunart, in 1879, Mr. Murray, gamekeeper, killed a very fine Wild Cat close to Strontian House, on February 14th. Mr. Murray tells me it took away a hen from his house. Snow being on the ground at the time, he tracked it easily to a laurel-bush within four hundred yards of Strontian House. He got the hen, and, setting his traps, secured the animal by ten o'clock the same night. In 1878 Mr. Murray captured another, also in February, in Carnbaan Wood, which had committed great havoc amongst the poultry and ducks of the crofters. He got another in 1874, in October, in Arieundle Wood; and a very fine one was caught by a shepherd at Ranachan, in Camusain Wood, on the north side of Loch Sunart, which was sent alive to Glasgow.

Forfar and Kincardine.—As regards Forfar, somewhat vague information exists that one was killed in the north-east of the county some nine or ten years ago, and was sent to the Montrose Museum. In Glendye, which drains into the Feugh and thence to the Dee at Banchory, two were killed by a gamekeeper named

Clark in 1850—the only ones seen in that quarter for thirty years previously. Glendye lies amongst the eastern extremities of the range of mountains which separates Forfarshire and Aberdeenshire.

Aberdeenshire.—The latest date I can obtain for this county is 1875, when one, a male, was killed in Glen Tanar on the 17th June by Mr. Milne, and none had been obtained there for thirty-six years previously. The next date is 1862, when one was trapped in the Invercauld district of Deeside, on February 11th, by James Lundie. "It was trapped at a rabbit-burrow close to where the road crosses Aultdowrie Burn between Aultdowrie Cottage and Invercauld House. It was afterwards stuffed and sent to Invercauld House." I have much corroborative evidence that this was the last killed in the district, but the appearance of others has been noticed since. In the upper valley of the Dee, around Old Mar Lodge, the last killed was about thirty years ago (say 1850) by Mr. M'Donald, late head keeper. Two young ones were obtained at the same time, and were kept for some time by the Duke of Leeds. What became of them subsequently is not known. In the parallel valley of the Don, John Robb killed another, the last obtained, above Alford Bridge, about 1862; and one only has been seen since, which latter may possibly have wandered to Glen Tanar and been killed as above noticed. Being a male, and possibly the last of its race for many miles round, this would sufficiently account for its wandering so far. The information that true Wild Cats are still found now and then about Mormond, near Strichen, and that four were seen at once on the farm of Techmuiry, near Mormond, about two years and a half ago (1877), requires further substantiation, as our knowledge of its present distribution throughout Scotland makes an isolated occurrence here extremely doubtful, as will be seen if the lines indicating the borders of its present territory be compared on the map of Scotland with the situation of the locality named. At the same time the description given of the animals seen somewhat answers that of the true wild species; in the absence, however, of more conclusive proof, it will be advisable to leave this an open question. Any future authentic occurrence here, however, may safely be held to substantiate this record.

Banff, Elgin, and Nairn.—Capt. Dumbar-Brander, of Pitgaveny, who has lived in Morayshire for the last fifty years, has

no recollection of seeing one, or hearing of one, killed in the low country—*i. e.*, from the Spey to the Findhorn along the coast, a distance of eighteen or twenty miles, and extending inland eight or ten miles to where the hills and the grouse-grounds begin. High up between the sources of the Findhorn and the Spey (Invernesshire) one is occasionally obtained. The only one of which the Rev. George Gordon, of Birnie, has any note in Moray, was killed at Cawdor, in Nairn, nearly fifty years ago. Edwards mentions one he saw which was killed in Glen Avon, but he gives no date: he considers it extinct now, though once abundant in the higher country. Besides the above information, I am informed of one which was killed at Dalry about nineteen years ago (say 1861). It used to be not uncommon long ago in Darnaway and Dalry Forests, near Forres, where, however, it is believed to be now extinct.

Invernesshire.—From this county I have a large store of information, which, however, I do not consider it desirable to impart in all the minutiae at present. It will be time enough for this when its extinction has actually taken place. It is becoming scarce all along Spey, even at Badenoch, and as far up the valley as Laggan, where the last—"a very old one"—was killed in 1873. It is not yet, however, extinct there. This one was killed at the back of the Manse at Laggan, on the glebe-lands, where there are large cairns frequented by rabbits.* In the Badenoch Forest and on the confines of North Perthshire, Aberdeenshire, and Banffshire, and in Rothiemurchus it is verging on extinction, if not already extinct. In Abernethy Forest it is extinct, and the last killed in Glenmore was in 1873. It is common still in Lochaber, Nether Lochaber, Arisaig and Moidart, Knoidart, and in all the suitable valleys of Northern Invernesshire north of the Caledonian Canal, where it is believed actually to be increasing in numbers in certain localities, owing to the protection afforded to it in the numerous deer-forests. The Rev. Alexander Stewart has recorded one seen, amongst others, by himself in the face of a cliff in a place called "Dubh-ghlaic," or Black Gully, in Lochaber, three years ago (1877), and of another killed under peculiar circumstances, also in Lochaber, about 1868 (see Zool.

* This one was preserved and stuffed for the Rev. Mr. M'Fadyen, of Laggan, lately deceased.

1880, p. 218). In Glen Nevis it is verging on extinction, and very few have been killed within the last ten or twelve years. One was killed in 1878 in Ben Alder Forest, three miles from Loch Erroch Lodge.

Rosshire and East Cromarty.—In Rosshire the Wild Cat is still abundant in the wilder portions, especially in the west of the county. I possess much interesting matter, kindly placed at my disposal by correspondents; but, for the reasons given under Invernesshire, I think it undesirable to communicate them. One correspondent, who has seen many specimens of the true Wild Cat, writes, "The largest I ever saw was forty-three inches long from nose to tip of tail." In East Rosshire, however, it is probably approaching extinction. The last killed of which I have record was by Mr. A. MacDonald about seven years ago (say 1873). It was thought rare at that time. "One blow behind the ear settled him." In Strathconan they still exist, but are very scarce, whereas ten or fifteen years ago they were very plentiful. Mr. F. D. Godman, in a letter to me, incidentally mentions a Wild-Cat-inhabited cairn on a shooting at Killellan, on Loch Alsh, Rosshire, and he found there a litter of Wild Cats which had been washed out and drowned by heavy rains and a thunderstorm. He does not, however, mention the date beyond "some years ago."

Sutherland.—Wild Cats are still far from being exterminated, and are still not uncommon in deer forests. The Duke desires to preserve them, and few are willingly killed, at least in his own Forest of Dunrobin. During hard winter-weather five years ago (about 1875) a very large one was caught within the precincts of the town of Golspie. Between the place where it was caught and the moorland, there were two miles of cultivated land, high road, woodyard, and garden. It had dug a hole under the floor of a lumber shed, and had there stored up six hens. The Rev. James M. Joass, who informed me of its capture, which took place not far from his house in Golspie, adds:—"It was brought to me fresh out of the trap and bleeding. It is now in the museum at Dunrobin, and the largest specimen there—a full-grown male, with perfect teeth and tail of the undoubtedly wild type." Another was killed, whilst swimming in Loch Brora, by a woman. Rev. Dr. Joass writes as follows:—"A woman walking towards Brora, on the Carril side of the loch, saw the cat in the water coming as if from the Gordonbush side, where there is a farm-

house, across a narrow part of the loch, where it is very deep, to the Carril Rock, where Wild Cats breed, and are occasionally trapped. Fearing lest, if she allowed it to land, she should have to turn back for a mile or more, and go round by the bridge, she resolved to attack it in the water, and partially stunned it with a stone. By the time it crawled ashore she had found a suitable stick, and killed it at the water's edge. The cat was afterwards seen by several who were well able to tell a Wild Cat from a tame one." I will here repeat the oft-quoted "List of Vermin destroyed and premiums paid for the same on the Duchess-Countess of Sutherland's Estates in the County of Sutherland, from March, 1831, to March, 1834."* From this list it appears that during that time 901 Wild Cats,† Martens, and Fumarts were destroyed; 2s. 6d. was given for each head, representing for these animals alone £112 12s. 6d. According to a list of vermin killed on Dunrobin Grounds, house cats and Wild Cats are distinguished, and six is the number of the latter killed, or reported, between 1873 and 1880. I am indebted to Mr. Inglis for this list of vermin, which presents much of interest to those who study the past and present distribution of our indigenous animals. From similar returns kindly placed at my disposal by Mr. M'Iver, from the Assynt and part of Durness districts, I find that one keeper in Assynt killed no less than twenty-six Wild Cats between 1869 and 1880, but of these only three during the last six years. Another keeper killed ten between 1870 and 1873, but none again until the winter of 1879-80, when he killed four, one of which is described as a "monster." This last was sent to Mr. M'Leay, Inverness, and eventually it was sold to a gentleman in Edinburgh.‡ In Durness they appear to be scarcer, judging from the returns. Between 1870 and 1880 records of two only, and these in 1878 and 1879,

* "On the Quadrupeds and Birds inhabiting the County of Sutherland, observed there during an Excursion in the Summer of 1834," by P. J. Selby, F.R.S.E., F.L.S., &c. (Edin. New Phil. Journ., Jan.—April, 1836, p. 158).

† In such lists, however, it is not always easy to separate veritable Wild Cats from tame, and the statistics must be taken "*cum grano salis*."

‡ The keeper referred to reports, "About four or five years ago I used to get a great many more, but the vermin are getting very scarce now." I may add here that a large number of lists of vermin received by me from Sutherland and various other parts of Scotland show the general decadence of the species in a very distinct and undeniable light.

being noted. In 1879 Mr. P. D. Maloch, of Perth, received "two or three" Wild Cats from Sutherland. Mr. T. E. Buckley informs me that in 1878 he got three cats, "which we took to be crosses between a Wild and a house cat, but the old ones were never caught, though one left its foot in a trap."

Caithness.—From Caithness I have no positive information, and I should be glad to have a correspondent in that county. From what has been said, however, by Mr. A. H. Cocks, in the introductory portion of this account, it would seem probable that the Wild Cat is restricted in its range to the parts of the county bordering upon Sutherlandshire.

In conclusion, I may observe that the above notes cannot be held to exhaust the subject—far from it. Every day up to publication brings in fresh data and new facts, tending to render the account of the species still more complete. Such notes I carefully preserve for further use, and I need not say any additions that your readers can make to the records will be very acceptable.

OCCASIONAL NOTES.

THE BEAVER IN NORWAY.—We learn from 'Nature' (Nov. 25th) that much interest has been excited in Norway by the recent appearance of a colony of Beavers on the Voldifjord, a branch of the Frierfjord, which is at a considerable distance from the Beaver-station still remaining at Omli on Nedenæs.

WHITE-BEAKED DOLPHIN IN THE FIRTH OF FORTH.—At the last meeting of the Glasgow Natural History Society, held November 30th, a paper was read by Mr. John M. Campbell on the occurrence of the White-beaked Dolphin, *Delphinus albirostris*, near the Bell Rock, in the Firth of Forth, in September last. The writer stated that although many of the rarer Cetaceans frequent our coasts, yet the imperfect knowledge we have of their habits, the difficulty of capture, and the nature of the element in which they live, all militate against the rapid accumulation of facts relative to their occurrence. The species in question, although recorded as British in 1846, has not yet been added to the Scottish fauna. Mr. E. R. Alston, in his list of the 'Mammalia of Scotland,' published by the Society last year, says:—"The White-beaked Dolphin is another species whose appearance in Scottish waters is to be expected, as it seems to visit the Færoes, and the east coast of England, but as yet its actual occurrence does not seem to have

been recorded." Mr. Campbell then noticed the instances on record where this species has been captured in English waters, and at various places on the Continent of Europe, and gave descriptions of the specimens and details regarding them. The specimen now reported as the first captured in Scottish seas is a young male. It was taken by some fishermen near the Bell Rock on the 7th September last, and came into the hands of Mr. Thomas Walker, fish merchant in the city, and was by him presented to the Kelvin-grove Museum.

[Mr. Campbell has been good enough to send us a full description, with measurements, which we hope to publish in our next number.—Ed.]

ORNITHOLOGICAL NOTES FROM NORTH NORTHAMPTONSHIRE.—A Hobby (*Falco subbuteo*) was killed by the gamekeeper of my neighbour, Mr. G. E. Hunt, early in July, and sent to me in the flesh; but in my absence the specimen was allowed to putrefy before it was sent to be preserved, and consequently lost to me. The person who killed this little Falcon positively assures me that he shot it in the act of attacking some young Pheasants at the coop; the species is not very uncommon with us, but as this is the first well-authenticated instance of its attacking young game which has come to my knowledge, I consider it worthy of record. The swampy condition of our meadows in the valley of the river Nen, after the floods of July and the early part of August, brought us a large number of Snipes (*Scolopax gallinago*), a bunch of some forty Teal (*Anas crecca*), a few Curlews and Redshanks (*Numenius arquatus* and *Totanus calidris*), an unusual number of Green Sandpipers (*Totanus ochropus*), some Spotted Crakes (*Crex porzana*), and a Falcon (*Falco peregrinus*), during the latter-named month. With the exception of the Redshank and Spotted Crake, none of the above-named species are uncommon in our neighbourhood; but we seldom see Snipes in any number before September, and still less often more than a few odd Teal before the end of that month; the Falcon no doubt was attracted by the Teal, and the very large flocks of Peewits (*Vanellus cristatus*) which were then haunting the meadows; we generally expect a Falcon or two with our first flights of winter fowl, but I have noticed for many years that, as soon as Teal appear in any number, a Peregrine is not far off. I have already recorded in 'The Zoologist' the occurrence of a Great Snipe (*Scolopax major*) on 13th September. I noticed the first Redwing (*Turdus iliacus*) of the season on September 17th. A small flock of some seven or eight Dunlins (*Tringa alpina*) visited our meadows September 18th. First Jack Snipe (*Scolopax gallinula*) of the season shot September 21st. First Ring Ouzel (*Turdus torquatus*) of season seen September 30th. On October 8th Mr. G. E. Hunt shot a Common Scoter (*Oidemia nigra*), female, and a Scaup (*Fuligula marila*) on

the flooded meadows not far from Aldwinkle. The former species is of course only a rare straggler so far inland; the Scaup has often occurred in our neighbourhood, but never before, to my knowledge, except in the depth of winter. Five immature Golden-eyes (*Clangula glaucion*) were shot on the Nen, near Aldwinkle, about October 18th. First Fieldfare (*Turdus pilaris*) of the season shot October 22nd. First Woodcock (*Scolopax rusticola*) of the season shot October 23rd. On November 12th I received a Merlin (*Falco aesalon*), female, juv., from one of my gamekeepers, who shot it in one of our meadows on the Nen, as it flew over his head with a Yellow-hammer in its talons. I have no exact record as to the first appearance in our neighbourhood this autumn of the Grey Crow (*Corvus cornix*), but I found them in force in West Norfolk on October 12th, and in Northamptonshire on my return thither on the 20th of that month. Several Short-eared Owls (*Asio brachyotus*) were met with in our neighbourhood towards the end of October, and one of this species sent to me in the flesh from Lilford November 15th. The summer floods must have destroyed many nests of Reed and Sedge Warblers (*Salicaria arundinacea* and *S. phragmitis*), both of which species are usually very abundant on the banks of the Nen, but were this year exceedingly scarce. We found an unusual number of Landrails (*Crex pratensis*) in the clover and turnips when Partridge-shooting in September; this was no doubt caused by the quantity of water in the meadows.—LILFORD.

IVORY GULL, HOOPOE, &c., AT REDCAR.—I omitted to mention before that an Ivory Gull was shot on the sands near East-scar, at Redcar, in November last year, and is now in the possession of a friend of mine. The taxidermist who preserved it has been in the neighbourhood for upwards of thirty years, and never before had one through his hands; it is in the plumage of the second year, a few dark spots on the head and neck, the back, wings and breast white. About the middle of September a Hoopoe was shot near Marske, and is preserved by a birdstuffer at that place. The abundance of Wheatears and Redstarts, mentioned by Mr. Cordeaux (p. 486), extended to the north of Yorkshire. Early in September I noticed some dozens of these birds amongst the bents on the side of the Tees breakwater; Wheatears are common enough with us in autumn, but I was much surprised on seeing such a quantity of Redstarts in a place where I do not remember ever to have seen one before. Although the autumnal migration commenced very early on this part of the coast,—large flocks of Whimbrels being seen on July 4th during a northerly gale, and others continuing to arrive almost daily,—yet the Tees-mouth was by no means “up to form” in the matter of shore-shooting, and I have very little to chronicle from that quarter, the only circumstance worthy of note, besides those already mentioned, being the appearance of a flock of Dotterels during the first week in September, but none of them were captured. The Dotterel has

become exceedingly rare in this district, the above-mentioned flock, composed of some dozen birds, being the first I have heard of for some years.—T. H. NELSON (North Bondgate, Bishop Auckland).

AUTUMN MIGRATION OF BIRDS ON THE EAST COAST.—On October 10th I saw two Ring Ouzels, presumed to have just arrived; these birds are very scarce in this neighbourhood. On the 11th, thousands of Rooks, Crows, Thrushes, and Larks were seen at daybreak coming over the sea; they continued to arrive all day, and at night Thrushes might still be heard migrating. Saw the first Hooded Crow to-day. A Mountain Finch was shot on the Dovercourt beach. A fine Norfolk Plover, sent me on the 11th, was shot the previous day at Bradfield, near Harwich, in a turnip-field. On the 20th several Woodcocks were seen migrating; one flew into the yard of 'The Cups Hotel' at Harwich; another flew against a window and was caught by a dog. On the 29th several Storm Petrels were seen in the harbour; one was picked up dead, probably exhausted by the fury of the storm. On November 4th the first flock of Snow Buntings were seen on the Dovercourt beach, and two in good plumage were shot. A Purple Sandpiper was also shot.—F. KERRY (Harwich).

GLOSSY IBIS IN ABERDEENSHIRE.—A Glossy Ibis, *Ibis falcinellus*, was shot on the mud-flats near the mouth of the river Ythan, in this county, on October 4th. The bird was a male, and in fine condition; its stomach was filled with a fibrous vegetable matter, along with sixty-six specimens of the rat-tailed maggot (larva of the drone fly, *Eristalis tenax*); two small pupæ, different, and unknown to me; four species of beetles, two of one sort and one each of the others, one of them being aquatic; four specimens of *Cyclas flavescens*; fragments of *Limnæus pereger*; and eight small specimens of *Mytilus pusillus*, as also five angular pieces of stone about the size of small peas. Extent of wings, $39\frac{1}{2}$ inches; from point of beak to end of tail, 24 inches; tarsus, $4\frac{1}{4}$ inches; middle toe, including nail, $3\frac{1}{4}$ inches; beak, along ridge, $5\frac{1}{2}$ inches; beak, eyes and toes, greenish grey; sides of head bare, and of the same colour as the beak; these bare parts, at their juncture with the feathers, both above and below the eyes, were edged with a narrow line of greenish white; iris brown; weight, $1\frac{1}{2}$ pounds. The sixth known to have occurred in Scotland.—G. SIM (King Street, Aberdeen).

ROSEATE TERN ON THE NORFOLK COAST.—A beautiful specimen of the Roseate Tern, *Sterna Dougallii*, Montagu, was shot near Hunstanton, Norfolk, on July 12th, and the skin is now in my collection. The person to whom it was sent for preservation neglected to ascertain or note the sex of this specimen, but I believe it to be a male, and certainly not a bird of this year. The attention of the shooter was attracted by the call of this Tern, which differed greatly from those of the Common and Little Terns, *Sterna fluvialis* and *S. minuta*, both of which species were very abundant at the date above-mentioned, in the same locality.—LILFORD.

STORM PETRELS IN YORKSHIRE.—Two of these birds were captured inland during October. On the 29th one flew into a person's face in our station-yard, and was knocked down as a Swallow, and taken to Mr. Helstrip, birdstuffer, where it died during the night. The other was taken alive at Sowerby, near Thirsk, and preserved by Mr. Robert Lee, naturalist, in that town.—JAMES BACKHOUSE, JUN. (West Bank, York).

LITTLE GULL ON THE MERSEY.—On November 1st, I received a specimen of the Little Gull, *Larus minutus*, which had been shot on the Mersey, off New Brighton. I believe it is the first time that this bird has been seen in the locality.—W. BELL (St. George's Mount, New Brighton).

[In Byerley's 'Fauna of Liverpool,' the Little Gull is stated to have been met with near New Ferry, and at Formby.—ED.]

GREAT GREY SHRIKE IN YORKSHIRE.—I saw a Great Grey Shrike close to this village on the 23rd of October. This bird has occurred in the West Riding several times before.—JOHN H. SALTER (Ackworth, near Pontefract).

[The Great Grey Shrike seems to have been more than usually common during the present winter. The immigration of this winter visitant seems to have commenced during the last week of October, when specimens were shot in Northumberland, at Whitley Sands, and at Misterton, Nottinghamshire; and during the month of November we noticed its occurrence at Laxton (also in Notts); at Brancaster; Holt (Norfolk); Seaton Carew; Tenbury (Worcester); Mere (Wilts); Ringwood (Hants); and Cranleigh (Surrey).—ED.]

HOOPOE IN SHETLAND.—On 18th October last, a specimen of the Hoopoe, *Upupa epops*, was shot in Unst, and sent to me. It was a female, and its stomach was filled with earwigs, *Forficula auricularis*.—GEORGE SIM (King Street, Aberdeen).

CORRECTION OF ERROR.—By some mistake in the title of Dr. Hamilton's article in the last number of 'The Zoologist,' "Sutherland" was printed for "Scotland." The title should have been "Ornithological Notes from W. Scotland."

THE MACKAREL SEASON IN CORNWALL.—During the last week of November our drift-boats were taking large, fat, and well-flavoured Mackarel by thousands per night. Generally catches of this sort do not occur after the beginning of June or before the end of February. We are accustomed to see small quantities of small Mackarel of very good quality taken with the later Pilchards even up to Christmas, but these catches of large fish at this time of the year are unusual. Whether they are late fish of the current year or early fish of the coming year it is impossible to say. A point

worthy of remark is that the Pilchard season of 1879 ran in an unprecedented manner into January, 1880, whilst the Mackarel season of 1880 commenced in an equally unprecedented manner in the latter part of January, 1880.—THOMAS CORNISH (Penzance).

JERSEY FISHES.—My assistant, Edward Matthews, has recently returned from a collecting expedition to the Channel Islands. Amongst other fish obtained while in Jersey, he took specimens of *Labrus Donovanii* and *Lepadogaster Condollii*, the former from lobster-pots and the latter from under stones in rock-pools at low tide.—JOHN T. CARRINGTON (Royal Aquarium, Westminster).

[We should have been glad of a little more information concerning these two uncommon fishes. Is the first named identical with the Comber Wrasse of Couch (vol. iii., p. 32), or in what respect does it differ from it? and has the latter been met with on the British coast? We do not recognise the specific name. Descriptions from living specimens are always valuable.—ED.]

FLIGHT OF THE FLYING FISH.—Apropos of the remarks which appeared under this heading in 'The Zoologist' for November (p. 471), the following observations by Mr. Moseley, in his 'Notes by a Naturalist on The Challenger' (p. 570), will be read with interest by all who are interested in this question. He says:—"Whilst on the subject of flight, I would say a few words about the flight of the Flying-fish. Dr. Möbius has lately produced an elaborate paper on the much-vexed question as to whether Flying-fish move their wings in flight or not, and after examination of the muscular apparatus, and watching the living fish, has come to the conclusion that they do not do so at all. There are two widely different genera of fish, which have developed long wing-like fins for support in progress through the air, the ordinary Flying-fish, the various species of *Exocetus* allied to the Gar-fish, and the flying Gurnets, species of the genus *Dactylopterus*. I have never seen any species of *Exocetus* flap its wings at all during its flight. These fish merely make a bound from the water, and skim supported by their extended fins, the tips of which meanwhile quiver in the air somewhat occasionally from the shifting a little of their inclination by the fish. I believe, however, that I cannot be mistaken in my conviction that I have distinctly seen species of Flying Gurnets move their wings rapidly during their flight. I noticed the phenomenon especially in the case of a small species of *Dactylopterus* with beautifully coloured wings, which inhabits the Sargasso Sea. Whilst out in a boat collecting animals amongst the gulf-weed, these small Flying Gurnets were constantly startled by the boat and flew away before it, and as they did so, appeared to me to buzz their wings very rapidly. Their mode of flight seemed to me to be closely similar to that of many forms of grasshoppers, which cannot fly for any great

distance, but raise themselves from the ground with a spring, and eking out their momentum as much as they can by buzzing their wings, fall to the ground after a short flight. I watched these little Flying-fish fly along before the boat, at the height of about a foot above the water, for distances of fifteen or twenty yards, and I chased and caught one or two with a hand-net amongst the weed. Dr. Möbius, who similarly watched the flight of a species of Flying Gurnet, maintains that neither forms of Flying-fish flap their wings at all during flight. *I do not consider the question as yet set at rest.* Of course no Flying-fish can raise themselves in the air at all by means of their wings alone." [The italics are ours.—ED.]

HABITS OF THE TARENTULA.—Herr V. Bergsö, in a recent work, 'Fra Mark og Skov,' has given some interesting data in regard to the habits of the Tarentula, *Lycosa tarentula*, Latr., whose nests he has traced and examined on the Roman Campagna. He found that the nest, which was well rounded and smooth, was approached by a tunnel which, after running about a foot straight down below the surface of the ground, made a sudden short turn before it finally descended for about another foot into the spider's abode. The entrance to the tunnel is concealed by an arched covering made by the interlacing of grasses and leaves. The eggs are inclosed in a spun bag, and the young appear in the autumn, when they immediately seat themselves on the body of the mother, where they remain till about April, neither parent nor offspring seeking food during their hybernation. As many as 291 individuals were on one occasion removed in February from the body of an emaciated Tarentula. The superstitious error of assuming that the bite of the animal induces an irresistible desire of dancing is due to the fact, that dancing having been originally employed as a remedy against the poison, which is believed to be eliminated by profuse perspiration, the action of the poison was confounded with the means of its eradication.—'Nature,' November 25th.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

November 18, 1880.—ROBERT M'LACHLAN, Esq., F.R.S., in the chair. Lieut.-Col. H. Godwin-Austen was elected a fellow of the Society.

Dr. George E. Dobson exhibited a remarkable parasitic worm, taken by him from the intestinal canal of *Megaderma frons*, from the Gold Coast. It appears to be allied to *Pterygodermatites plagiostoma*, Wedl, from the intestine of the Long-eared Hedgehog, *Erinaceus auritus*, though on the

first examination he (Dr. Dobson) had inclined to regard it as representative of a new genus, *Metabdella* (see 'Nature,' No. 593).

Dr. J. D. M'Donald drew attention to its peculiar anatomical structure and natural relationships, still further to be elucidated by him shortly in the 'Annals and Magazine of Natural History.'

Dr. Cobbold agreed in the high importance of the observations as not only verifying previous discoveries, but adding novel structural details. He regarded the worm as identical with the *Ophiostomum* of Rudolphi and Willemoes Suhm, with *Pterygodermatites* of Wedl, and with *Rictularia* of Frœlich. He further looked upon it as an aberrant member of the *Ophiostomidæ*, whereas Wedl thought the parasite came nearest to the *Cheiracanthidæ*.

Dr. Cobbold exhibited five specimens of *Distoma crassum*, Bush. He stated that the Chinese missionary whose parasites had been brought before the Society in 1875 had, on his return to China, again become the victim of these large flukes. Not only so, but his wife and daughter were attacked, and all of them had been compelled to return to England.

A paper, "On the Classification of the *Gasteropoda*" (part ii.), was read by Dr. J. Dennis M'Donald. In this communication the author gave further data in support of his mode of classification of the group dependent on anatomical characters.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

November 30, 1880.—Dr. EDWARD HAMILTON, Vice-President, in the chair.

Mr. Alfred E. Craven read a paper on a collection of land and fresh-water shells from the Transvaal and Orange Free State in South Africa, with descriptions of nine new species.

A second paper by Mr. Alfred E. Craven contained the descriptions of three new species of land shells from Cape Colony and Natal.

Surgeon Francis Day communicated a paper by Prof. A. A. W. Hubrecht, which gave an account of a collection of reptiles and amphibians made by Dr. C. Duke in Beloochistan.

A communication was read from Mr. J. H. Gurney, containing a description of the immature plumage of *Dryotriorchis spectabilis* (Schleg.), a very scarce raptorial bird from Gaboon, now living in the Society's Gardens.

A communication was read from Mr. Roland Trimen on an undescribed *Laniarius*, obtained by Dr. B. F. Bradshaw on the Upper Limpopo, or Crocodile River, in Southern Africa, which he proposed to name *Laniarius atrocroceus*.

A communication was read from Dr. G. Hartlaub, containing descriptions of five new birds which had been collected by Dr. Emin Bey in Central Africa. These were proposed to be called *Tricholais flavotorquata*, *Cisticola hypoxantha*, *Eminia lepida*, *Drymocichla incana*, and *Muscapa insulata*.

Mr. W. A. Forbes read a paper on the external characters and anatomy of the Red Ouakari Monkey, *Brachyurus rubicundus*, describing more particularly the liver and brain, and made remarks on the other species of that genus and their distribution.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

November 3, 1880.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., &c., President, in the chair.

Mr. Edward Meyrick, of Ramsbury, Hungerford, Wilts, was balloted for and elected an ordinary Member. Capt. Thomas Broun, of Auckland, New Zealand, a former Subscriber, was balloted for and elected an ordinary Member. Dr. E. Brandt, President of the Russian Entomological Society, &c., of the Imperial Medico-Chirurgical Academy, St. Petersburg, was balloted for and elected a Foreign Member.

Mr. C. O. Waterhouse exhibited, on behalf of Mr. Sydney Olliffe, a pair of dwarf specimens of *Epione vespertaria*, taken at Arundel.

Mr. M'Lachlan exhibited some very curious galls on a broad-leaved *Eucalyptus* from Australia. They were of large size, very hard, with four longitudinal keels, each of which was prolonged into a long cornute appendage. The maker of the galls was a Lepidopterous larva, perhaps pertaining to the *Pyrilidæ*.

Mr. M'Lachlan mentioned that he had received a letter from Mr. D. G. Rutherford, from Camaroons, West Africa, in which the writer stated that he had taken *Papilio merope* and *P. cenea*, in copulâ, and had obtained eggs and young larvæ therefrom.

Mr. Roland Trimen observed that the observation was important as confirming the statements as to the polymorphic condition of the female of *merope*.

Prof. Westwood exhibited a globular gall on the surface of a sallow-leaf, made by a species of *Tenthredinidæ*; also a Dipterous larva (*Syrphus*), found closely adhering to the stem of a pelargonium.

Mr. W. F. Kirby exhibited, on behalf of the Rev. J. K. Brown, of Maidstone, a remarkable variety of *Epunda lutulenta*; and, on behalf of Mr. Ralfe, a specimen of *Apatura ilia*, which this gentleman stated he had captured in Pinner Wood last July.

Sir John Lubbock exhibited some interesting larvæ which Mr. Calvert had forwarded to him from the Troad, through Sir J. Hooker. He stated

that these larvæ had recently appeared there in great numbers, and were likely to prove most useful, as they fed on the eggs of locusts. The larvæ were, in his opinion, Coleopterous, probably those of a beetle allied to *Cantharis*. Mr. Riley had recently described the transformations of certain insects belonging to this group, and natives of the United States. The young larvæ on first hatching are thin, active little creatures, which eat their way into the cases of locust's eggs, where they rapidly grow into fat, fleshy grubs. Mr. Calvert states that in his neighbourhood a large proportion of the locusts' eggs have this year been destroyed by these larvæ. Sir John Lubbock suggested that if the species does not exist in Cyprus it might be worth while to introduce it there.

Mr. Roland Trimen exhibited the wingless female Hymenopteron, of which he had recently sent a sketch and brief account to the Society (see Proc. Ent. Soc., July 7th, 1880, p. xxiv), and which, from all the circumstances attending its discovery near Cape Town by Mr. C. A. Fairbridge, he had strong grounds for regarding as the female of the well-known *Dorylus helvolus*, Linn. He also showed a second specimen of the same female, presented to the South-African Museum by M. C. L. Péringuey.

Mr. Trimen also exhibited six cases fabricated by a South-African Lepidopterous larva, of which the outer covering consisted, not of pieces of grass, twigs, or other vegetable substances, but of particles of sand and fragments of stone. The very peculiar aspect of these cases was due to the fact that along each side was attached a series of much larger fragments of stone, roughly triangular in shape, and regularly arranged in a single row, with the longest point outwards; the effect of this arrangement being to give the case the general appearance of a Myriapod, and indeed a not very remote resemblance to *Peripatus*. These cases (in two instances containing the living larvæ) were found in the dry elevated "Karoo" country of the Cape Colony, in the districts of Beaufort and Clanwilliam, and were presented to the South-African Museum by Mr. Thomas Bain and Mr. J. R. Maquard respectively. Mr. Trimen was unable to rear the larva, owing to ignorance of its food-plant; but, from its appearance when out of its case, he thought that it would in all probability have furnished a large moth of the family *Psychidæ*.

Sir Sidney Saunders read a paper "On the habits and affinities of the Hymenopterous Genus *Scleroderma*, with descriptions of new species."

Mr. Edward Saunders read a paper entitled "A Synopsis of British *Heterogyna* and fossorial *Hymenoptera*."

Prof. Westwood read a paper containing descriptions of new species of exotic *Diptera*, with a supplement containing descriptions of species formerly published by the author in inaccessible periodicals.—R. MELDOLA, *Hon. Secretary*.

NOTICES OF NEW BOOKS.

Island Life; or, the Phenomena and Causes of Insular Faunas and Floras, including a revision and attempted solution of the problem of Geological Climates. By ALFRED RUSSEL WALLACE, Author of 'The Malay Archipelago,' &c. Demy 8vo, pp. 512, with twenty-six Maps and Illustrations. London: Macmillan & Co. 1880.

THERE must be few, if any, of our readers who have not derived both pleasure and profit from a study of Mr. Wallace's 'Geographical Distribution of Animals,' published in 1876. The present volume, which may be considered as a popular supplement to, and completion of, that work, will afford no less gratification and instruction. It deals with highly important and interesting problems, and embodies a mass of facts collected and arranged with admirable skill and precision. Although at first sight somewhat fragmentary and disconnected, it is really the development of a clear and definite theory, and its application to the solution of a number of biological problems. That theory is, briefly, that the distribution of the various species and groups of living things over the earth's surface, and their aggregation in definite assemblages in certain areas, is the direct result and outcome of a complex set of causes which may be grouped as "biological" and "physical."

The biological causes, to use the author's own words, are mainly of two kinds—*first*, the constant tendency of all organisms to increase in numbers and to occupy a wider area, and their various powers of dispersion and migration through which, when unchecked, they are enabled to spread widely over the globe; and, *secondly*, those laws of evolution and extinction which determine the manner in which groups of organisms arise and grow, reach their maximum, and then dwindle away, often breaking up into separate portions which long survive in very remote regions.

The physical causes are also mainly of two kinds. We have, *first*, the geographical changes which at one time isolate a whole fauna and flora, at another lead to their dispersal and intermixture with adjacent faunas and floras; and, *secondly*,

climatal changes, the causes of which Mr. Wallace investigates at some length, with the aid of geologists, physicists and explorers.

In the first half of his work (pp. 1—229), Mr. Wallace deals with "The Dispersal of Organisms," its phenomena, laws, and causes. Beginning with simple and familiar facts relating to British and European quadrupeds, he defines the character of "areas of distribution" (Chap. II.) as applied to species, genera, and families, and illustrates the subject by maps showing the peculiarities of distribution of some well-known groups of birds. Taking our British mammals and land-birds, he follows them over the area they have been found to inhabit, and, classifying the facts of distribution (Chap. III.), obtains a foundation for the establishment of "zoological regions," which are clearly characterized as distinct from the usual geographical divisions of the globe.

The facts thus far established are then shown (Chap. IV.) to be necessary results of the "law of evolution." The nature and amount of "variation" is exhibited by a number of curious examples; the origin, growth, and decay of species and genera are traced, and all the interesting phenomena of isolated groups and discontinuous generic and specific areas are shown to follow as logical consequences.

Mr. Wallace next investigates (Chap. V.) the means by which animals are enabled to overcome the natural barriers which often seem to confine them to very restricted areas, the extent to which these barriers are liable to be altered or removed, and the nature of the changes of sea and land which have taken place in past times. The last-mentioned portion of the enquiry is shown to be the most important, as it is the most fundamental, and is discussed at some length, evidence being adduced to prove that the main features of our globe—the position of the great ocean and the chief land-areas—have remained, on the whole, unchanged throughout geological time. The general stability of continents, however, has been accompanied by constant changes of form, and insular conditions have prevailed over every part in succession, and the effect of such changes on the distribution of organisms is pointed out.

In the succeeding three chapters (VI., VII. and VIII.) Mr. Wallace investigates very fully the question of geological climates

and their causes, considering that changes of climate have doubtless been agents of the first importance in modifying specific forms as well as affecting the distribution of animals. Step by step the foundation is laid for a scientific interpretation of the phenomena of distribution, until the reader reaches the second part of the work (pp. 233—512), which embodies the results of an investigation of a series of typical Insular Faunas and Floras, with a view to explain the interesting phenomena they present.

Amongst other conclusions arrived at, Mr. Wallace argues, from the evidence which he adduces, that “mere distance is one of the least important of the causes which have determined the likeness or unlikeness in the animals of different countries;” “that such differences and resemblances cannot be due to existing conditions, but must depend upon laws and causes to which mere proximity of position offers no clue;” and “that if we compare corresponding portions of different continents we find no indication that the almost perfect similarity of climate and general conditions has any tendency to produce similarity in the animal world.”

In conclusion, Mr. Wallace expresses his conviction of the complete interdependence of organic and inorganic nature. “Not only,” he says, “does the marvellous structure of each organised being involve the whole past history of the earth, but such apparently unimportant facts as the presence of certain types of plants or animals in one island rather than in another are now shown to be dependent on the long series of past geological changes,—on those marvellous astronomical revolutions which cause a periodic variation of terrestrial climates,—on the apparently fortuitous action of storms and currents in the conveyance of germs,—and on the endlessly varied actions and reactions of organised beings on each other.”

We close this volume with a sense of deep obligation to Mr. Wallace. Following his guidance, we have felt as one led by some “good fairy” to the top of a high mountain; we have looked down into the valleys beneath, and beyond across the great expanse of ocean with its many islands; we have seen passes, peaks, and glaciers while listening to the story of their origin; we have noted a marvellous variety of vegetation, and have become acquainted with many strange and curious animals,

while marking the countries which they inhabit and the limits which appear set to their geographical distribution. We have felt the changes of climate as we travelled; and having followed the explanation of all we have witnessed, so attractively and withal so logically offered by our guide, we leave him with a feeling of regret that our voyage of discovery has ended.

New Guinea: what I did and what I saw. By L. M. D'ALBERTIS.

Two vols., 8vo, with four coloured plates and numerous woodcuts. London: Sampson Low & Co. 1880.

THOSE who follow the course of events in the Natural History world have been for some time aware that Signor D'Albertis has been engaged in exploring New Guinea. The reports of his progress and of his collections received by the Zoological Society of London, and published also in Italian and other foreign scientific journals, have awakened the liveliest interest, more especially among ornithologists and entomologists, and have served to whet the appetite for a fuller account of his travels whenever this should appear.

In two handsome volumes, with several nicely executed coloured plates and many woodcuts, Messrs. Sampson Low, Marston and Co., have just published the long-expected work, and English readers are now put in possession of the Italian traveller's narrative of his adventures. This he gives us in the form of a journal, the first volume containing an account of his voyage to New Guinea in 1872-73, and his visit to Yule Island in 1875; the second volume embodying the results of his three explorations of the Fly River, made in 1875, 1876, and 1877.

When, on the 8th April, 1872, the author first sighted New Guinea, he found himself approaching a mountainous country, overgrown with dense forest. The hills, whose base was washed by the sea, seemed to rise up as barriers to defend the entrance of the country which he proposed to explore. Behind these hills rose other and higher mountains; but all, so far as he could perceive, were clothed with rich vegetation. From Sorong to Dorey—that is to say, during a coasting voyage of 200 miles—he not only discovered no great river, but not even one that could be considered of any importance.

Although this portion of New Guinea has hitherto attracted the greatest number of travellers, and for more than twenty years several Dutch missionaries have lived here, yet the interior is the least known,—indeed we might say it is completely unknown,—Signor D'Albertis and his companion, Dr. Beccari, being as yet the only Europeans who have ventured into the interior at all. “The northern peninsula of New Guinea,” says the author, “may be regarded by geographers as a virgin country.”

As regards climate, within so few degrees of the Equator, the heat is, of course, great; the rainfall frequent and heavy, and the evaporation therefore considerable. The fevers common in tropical countries are rife in New Guinea, as the author and his companion discovered to their cost; and many a time was Signor D'Albertis lying at death's door, stricken down by this malignant enemy. With a good constitution, however, strengthened by judicious doses of quinine, and favoured by more than usual good fortune in meeting with assistance at critical junctures, the traveller recovered his health again and again, and with fixed resolution continued his adventurous journey, at one time going ashore to procure food and collect birds and insects, at another following the coast to land elsewhere in search of new hunting grounds; anon taking up his quarters for weeks in one spot, and exploring some rich collecting-ground, where, as at Hatam, a village on Mount Arfak, every shot brought down a bird of a new species, and every insect picked up was new to him.

Most remarkable and beautiful were many of the birds and insects met with, several of them previously undescribed and quite unknown. Of 180 different kinds of birds collected in N.W. New Guinea in 1872, thirty proved to be new species. Amongst the most noticeable are those of which the author has given coloured plates, namely, *Lophorina superba*, *Parotia sexpennis*, *Drepanornis Albertisii*, and *Paradisaea raggiana*. These are all Birds of Paradise, vieing with each other in the loveliness of their plumage and the brightness of their metallic tints. No descriptions can adequately convey an idea of their strange forms and beautiful colours, and Signor D'Albertis has therefore done well to furnish tinted figures of them.

New Guinea is very deficient in Mammalia as compared with Australia, though this apparent poverty may in part depend on our very scanty knowledge. Amongst those met with by Signor

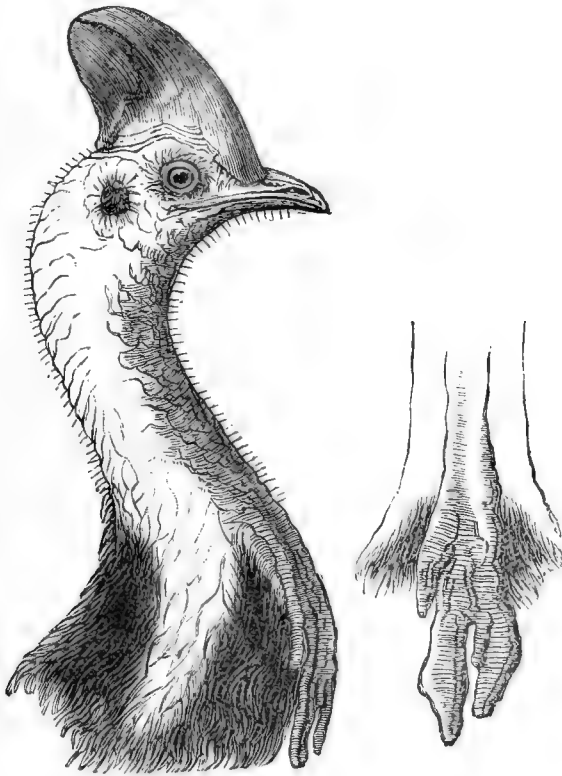
D'Albertis, we particularly notice two species of prehensile-tailed, opossum-like Phalangers (*Phalangista Bernsteinii* and *P. pennata*), and a small Kangaroo (*Dorcopsis luctuosus*), called by the natives "Barai." Full-page engravings of these are given, one of which, through the kindness of the publishers, we are enabled to



reproduce here. As an engraving it could hardly be better, the softness of the fur being capitally rendered. If, however, the artist had removed the short stump under the chin, which distracts the eye of the observer, and has too much the appearance, from its

position, of another leg, the portrait would have been still more life-like.

Our second illustration represents the head and neck-wattles of a Cassowary, which the author calls *Casuarinus Beccarii*, so named after his friend and fellow-traveller, Dr. Beccari, who discovered it. It seems to us, however, that this cannot be *Casuarinus Beccarii*, Sclater* (which is one of the double-wattled Cassowaries having a median throat-wattle divided at its extremity into two small lobes), but must be identical with *Casuarinus tricarunculatus*, described by Dr. Beccari from Salwatti,



New Guinea.† The absence of an “Index” to the work before us is much to be regretted, for without it it is impossible to discover and compare the various passages relating to a given species which are scattered throughout eight hundred pages. It

* See Sclater, Proc. Zool. Soc., 1875, pp. 87, 527, pl. 58; and Harting, ‘Ostriches,’ p. 107, and Preface to second edition, p. xvi.

† Ann. Mus. Genov., vii., p. 717.

is quite possible therefore that, as regards the Cassowary just mentioned, we may have overlooked a remark of the author's which, perhaps, definitely settles its identity. And here we cannot help observing that although Signor D'Albertis has shown himself to be a most energetic traveller and enthusiastic collector, he has little claim to be regarded as a scientific naturalist. To take the Birds only, he appears to know but little of their structure and affinities, and nothing of the points which await settlement and can only be settled by those who have opportunities of examining specimens in a living or recently-killed state. This is to be regretted, for Signor D'Albertis has had rare opportunities which fall to the lot of but few—opportunities which should have enabled a trained observer to produce far more valuable results.

Nevertheless we must not forget the many new and beautiful species which Signor D'Albertis has discovered, and which but for his energy and perseverance would probably be still unknown. In this respect he has rendered a service to Science for which all naturalists will thank him. The interesting account which he has given of his travels in the two volumes before us will be read with interest not only by zoologists, botanists, and ethnologists, but by all who desire to know something about one of the most remarkable and least explored countries in the world.

Sir Andrew Smith's Miscellaneous Ornithological Papers, 1830-34.

Reprinted for the Willughby Society. 1880.

WE have already noticed (Zool. 1880, pp. 159, 375) the excellent aim of this Society. The present volume, the third of the series, contains a reprint of papers on Ornithology published fifty years since in 'The South African Quarterly Journal,' and hitherto practically inaccessible.

The Editor, Mr. O. Salvin, in a neat Introduction, gives a brief account of Sir A. Smith's labours as a naturalist, and of the nature and extent of his collections.

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THIRD SERIES.

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[No. 50.

ON THE OCCURRENCE OF THE WHITE-BEAKED DOLPHIN NEAR THE BELL ROCK.*

By J. M. CAMPBELL.

ALTHOUGH it is to be expected that many of the rarer *Cetacea* frequent our coasts, the as yet imperfect knowledge of their habits, the difficulty of capture, and the nature of the element in which they live, all militate against the rapid accumulation of facts relating to their occurrence.

The species which is the subject of this paper, although recorded as British so long ago as 1846, has not hitherto been added to our Scottish fauna. Mr. Alston, in his paper "On the Mammalia of Scotland," read to this Society in April of last year, referring to this species, says:—"The White-beaked Dolphin is another species whose appearance in Scottish waters is to be expected, as it seems frequently to visit the Færoes and the East coast of England (Cunningham, Proc. Zool. Soc., 1876, p. 686), but as yet its actual occurrence does not seem to have been recorded."

This species was first figured and described by Brightwell, in the 'Annals and Magazine of Natural History' (vol. xvii., p. 21), in 1846, under the name of *Delphinus tursio*, Fabr., from a female taken by herring fishermen at Great Yarmouth in October, 1845, the skin and skeleton of which are now in the British Museum. There is, however, a skull of one which was killed at Hartlepool

* Read to the Natural History Society of Glasgow, 30th Nov. 1880.

in 1834, in the Museum of Cambridge University, the species not being recognised at the time. Dr. Gray, after an examination of Brightwell's specimen, described it as a new species under the name *Lagenorhynchus albirostris*. On the 29th December, 1862, a full grown male was found stranded on Little Hilbre, one of two closely contiguous islands at the mouth of the Dee, Wales, and is described in the 'Annals and Magazine of Natural History' for 1863, p. 268, by Mr. T. J. Moore, of the Liverpool Museum, to whom it had been sent. In 1866 one was shot on the coast of Cromer, Norfolk, by Mr. H. M. Upcher, of Sherringham Hall, the skull being preserved in the British Museum. In 1867, according to Bell, a young male whose skeleton is in the University of Cambridge, was killed on the English coast. Dr. Murie, in his "Notes on the White-beaked Bottlenose" (Linn. Soc. Journ., vol. xi., p. 141), in 1870, describes the anatomy of a full-grown male captured a few years before on the south coast of England, part of the viscera of which is preserved in the College of Surgeons, and the skeleton is in the British Museum. In September, 1875, Dr. Cunningham obtained a young female caught off Great Grimsby, which he figured and described in the Zoological Society's 'Proceedings' for 1876, the skeleton of which is in the Edinburgh University Museum. The same volume also contains a paper by Mr. Clark on a young male caught on the 26th March, 1876, off Lowestoft.

In 'The Zoologist' for 1878 Mr. A. G. More, of the Museum of Science and Art, Dublin, says in reference to this species:—"We have long had in the Museum here a coloured cast of a Dolphin captured some fifteen years ago in the vicinity of Dublin Bay, which lately, by comparing a coloured sketch taken from the fresh animal with the excellent figure given in the 'Proceedings of the Zoological Society' for 1876 (p. 679, pl. 64), I was able to identify as *D. albirostris*, J. E. Gray." The last recorded specimen was a young female captured by some Yarmouth fishermen on the 24th August, 1878, which Mr. T. Southwell, of Norwich, described in 'The Zoologist' of that year.

These, so far as I have been able to learn, are all the British specimens which have been recorded. On the Continent it has been taken at Ostend, Kiel, Bergen, Gullholmen, and Skanör.

The individual which I now describe, a young male, was taken by some fishermen near the Bell Rock, on the 7th September last,

and came into the hands of Mr. Walker, a fish merchant in the city, who presented it to the Kelvingrove Museum on the 9th. It was in good condition.

The following are a few measurements taken at the time:—

Total length	-	-	-	-	-	5 ft. 8 in.
Length of muzzle	-	-	-	-	-	0 „ 1½ „
„ to eye	-	-	-	-	-	0 „ 8¼ „
„ to blow-hole	-	-	-	-	-	0 „ 10 „
„ to ears	-	-	-	-	-	0 „ 11½ „
„ to pectoral limbs	-	-	-	-	-	1 „ 1½ „
„ to dorsal	-	-	-	-	-	2 „ 5½ „
„ of pectoral	-	-	-	-	-	1 „ 1 „
Greatest breadth of pectoral	-	-	-	-	-	0 „ 4¾ „
Breadth of caudal	-	-	-	-	-	0 „ 3¼ „
Height of dorsal	-	-	-	-	-	0 „ 7½ „
Circumference of thickest part	-	-	-	-	-	3 „ 3¼ „
Width of orbit	-	-	-	-	-	0 „ 0¾ „
Width of blow-hole	-	-	-	-	-	0 „ 1½ „
Skull:—Length, entire	-	-	-	-	-	1 „ 0¾ „
„ Length of nose, from front of blow-hole	-	-	-	-	-	0 „ 7¾ „
„ Width at orbit	-	-	-	-	-	0 „ 5¾ „
„ Width in front of notches (base of beak)	-	-	-	-	-	0 „ 3¼ „
„ Width of middle of beak	-	-	-	-	-	0 „ 2¾ „
„ Width of lower jaw at condyles	-	-	-	-	-	0 „ 5¾ „
„ Width of lower jaw, along one side from condyles to symphysis	-	-	-	-	-	0 „ 10 „

In shape and colour it resembled more closely the Lowestoft specimen described by Mr. Clark, the body tapering gradually from the dorsal fin, and, like the female described by Mr. Southwell, it did not exhibit the humped appearance described by Dr. Cunningham. The beaked shape of the head was very marked, the upper lip projecting one inch and a half beyond the head, which had a gradually rounded outline. On each side of the upper lip were four black bristles which projected but slightly through the skin.

The general colour above was a beautiful purplish black, the entire beak from the furrow dividing it from the head and the ventral surface till within twenty-one inches from the cleft of the tail was a satiny white, slightly yellowish on the under surface. Above the pectoral fins and behind the eye was a greyish white spot, thickly splashed or streaked with brown; a similar

linear-shaped spot ran in an oblique direction from slightly before the dorsal fin in the direction of the vent, and a larger one which measured about thirteen inches long and about three inches wide ran along the side behind the dorsal.

The ear-opening was very small, and could be detected with difficulty, barely admitting an ordinary pin.

The number of teeth in the upper jaws was twenty-three on each side, and in the lower jaws twenty-four and twenty-five, but some of them were barely through the gum, one or two at the front being mere denticles. They were sharp, conical, and curved inwards, and had a slight longitudinal groove on their anterior and posterior surfaces. They seemed to be quite free and movable. The lower jaw projected slightly beyond the upper. Owing to insufficient facilities for maceration a few of the teeth were lost, and for a like reason I have been unable with certainty to note the number of vertebræ, some of the smaller being merely cartilage. Previous to maceration I had counted ninety vertebræ. The first two cervical vertebræ are ankylosed, the remainder free.

I have not any doubt that this individual is a young *Delphinus albirostris*, or more properly *Lagenorhynchus albirostris*, Gray.

I may remark that the figure by Brightwell, copied by Bell, in his 'British Quadrupeds,' is very far from correct, that of Mr. Clark, as I have already said, approaching nearer to this one. Some interesting anatomical peculiarities have been noted by Mr. Clark, Drs. Cunningham and Murie, in their respective papers.

ON THE ALLEGED FORMER EXISTENCE OF THE PTARMIGAN IN CUMBERLAND AND WALES.

By A. G. MORE, F.L.S.

I HAVE been lately endeavouring to trace back the record, so often repeated, of the former existence of the Ptarmigan in Cumberland and Wales; but hitherto with very unsatisfactory results. I am therefore led to ask the readers of 'The Zoologist' if any one can help me with a reference to any writer contemporaneous with, or earlier than, Pennant, who appears to have been the first to publish the locality of Keswick, which, with the addition of Wales, is repeated a few years later by Latham in his 'General Synopsis.'

It will not be uninteresting to follow, from the first, the variations and additions which have been made by subsequent authors.

Pennant (1776), in the fourth edition of his 'British Zoology,' says of the Ptarmigan, "A few still inhabit the lofty hills near Keswick, in Cumberland."

Latham (1783) copies these words verbatim, adding, "as well as in Wales"; and here it is well to observe that Pennant, himself a Welshman, and taking particular interest in the fauna of the principality, makes no mention of Wales as a locality for the Ptarmigan, either in his 'British Zoology' or in his 'Tour in Wales.'

Dr. Heysham (1794), in his account of Cumberland animals, given in Hutchinson's 'History of Cumberland,' refers to both Pennant and Latham, and says, "The Ptarmigan is become a very scarce bird in Cumberland; and I believe is nowhere to be found in this county, except on the lofty mountains about Keswick." A statement which may have been derived from the same source as Pennant's, or may be an adaptation, in slightly varied language, from the 'British Zoology'; and, if Dr. Heysham spoke from independent observation, or enquiry, it is to be regretted that he has furnished so little in addition to what was already known. Whatever we may think of his testimony, so far as I know, he only, after Pennant, can be quoted as a possibly independent authority.

Thenceforward most authors have been content to repeat the old localities of Keswick and Wales,† or Cumberland and Wales,‡ varied, in the language of Montagu (1802), as "Some few are yet found to the south of the Tweed."*

But, in 1825, Selby departs still further from the original statement, when he writes:—"According to Pennant and earlier

* Graves, in his 'British Ornithology,' the first edition of which was published in 1811, remarks that this bird "is rarely to be met with but on the high mountainous parts of this country, on the highlands of Scotland, and on the hills of Snowdon, in Wales; they abound on all the heathy mountains in the north of Westmoreland and Cumberland, and like the Grouse feed on most kinds of mountain berries."—ED.

† Walcott, 'Synopsis of British Birds' (1789); Donovan, 'Natural History of British Birds' (1794).

‡ Lewin, 'Birds of Great Britain,' vol. v. (1797); Bewick, 'History of British Birds' (1797).

writers, this species seems, at one period, to have inhabited some of the mountainous ridges of Cumberland and Westmoreland." Selby is the first to omit Wales.

A few years later, Sir W. Jardine, in his 'Game Birds' (1834), says:—"According to Pennant, and some contemporary writers, these birds were found on the hills of Westmoreland and Cumberland; and, I believe, recollections now exist of a few having been seen upon the high ranges which appear on the opposite border of Scotland. These have been for some time extirpated, and unless a few solitary pairs remain on Skiddaw, or some of its precipitous neighbours, the range of the Grampians will be its most southern British station." The same words are repeated in Jardine's 'Birds of Great Britain and Ireland,' part iii. (1842); but I have not been able to discover who were these earlier and contemporary writers, unless Latham, Walcott, Lewin, and Heysham are intended, all of whom, with perhaps the exception of Heysham, evidently copied from Pennant.

Jenyns (1835) gives Cumberland and Westmoreland; Macgillivray (1837) Wales and North England; and, lastly, Yarrell, in all three editions, still repeats Cumberland and Westmoreland, as former localities for the Ptarmigan.

Thus, for more than a hundred years, we find Pennant's original station of Keswick continually quoted, and this apparently without any confirmation, or fresh enquiries; and the range has been even extended, so as to include Westmoreland. We have Wales repeated up to 1837, although Latham is the sole and unsupported authority for the statement; and we are led to conclude, from the silence of Pennant, and the want of any corroboration since the time of Latham, together with the omission of Wales by many of our best authorities, that Latham unconsciously added Wales, in the belief that he had quoted it from Pennant, who was so well known as an authority concerning his own country.

Dismissing Wales, then, as probably a misquotation, I believe I am now able to offer a possible explanation of the Keswick locality, through the assistance of my friend Mr. W. K. Dover.

Mr. Dover, himself residing at Keswick, has kindly instituted enquiries on the spot, and he tells me that there is, even now, a "white" or white-mottled variety of the Red Grouse, known to frequent Skiddaw Forest. His friends have there met with a

few "highly white-mottled Grouse," which the gamekeeper had also observed for several years, and Mr. Dover himself has seen and shot upon Skiddaw some Grouse, "with plumage much mixed with white, and with their legs deeply feathered, white to the toes, so as to give them a whitish mottled appearance when seen upon the open at a little distance." Again, in a more recent letter, he tells me that a few years ago a party, when shooting Grouse upon Shap Fells, in Westmoreland, met with two or three birds which were so white that two Scotch gamekeepers who were present called them Ptarmigan; and these birds both Mr. Dover and his informant believe were white-mottled Grouse. So far, Mr. Dover has not succeeded in finding any tradition of the former existence of the Ptarmigan in the Lake District.

Hence, I think, we may assume that Pennant and Heysham (if the latter did not quote Pennant) may have derived their knowledge from the same informant, who, in the careless way in which Natural History was then studied, is very likely to have merely reported the existence, in small numbers, of a white or white-mottled Grouse upon the mountains near Keswick; and the Ptarmigan having, at that time, only lately been included in the British fauna, any "white" or "white-mottled" Grouse would be identified with it.

I conclude, accordingly, that it was some white or whitish variety of the Red Grouse, and not the Ptarmigan, which used, in the time of Pennant, to frequent, as it does still, the lofty hills near Keswick.

ORNITHOLOGICAL NOTES FROM WEST SUSSEX.

BY WILLIAM JEFFERY.

THE index in the closing number of 'The Zoologist' for 1880 reminds me that I have not been a contributor to its pages during the year. I find that my last note recorded to the end of 1878 only.

There has not been much to chronicle throughout the years 1879 and 1880. Two severe winters, an unusually wet and cold summer (1879), have afforded little material for comment in an ornithological point of view, but I append a few notes from my diary.

In 1879, on the 31st January, large flocks of Larks were seen wheeling about high up in the air, as if contemplating migration, followed next day (February 1st) by driving sleet and snow, with S.E. wind, and on the 2nd by rain. On the 12th February two wild Swans, *Cygnus ferus*, were shot at Pagham Harbour—or rather, at what remains of it since its reclamation for agricultural purposes. Brent Geese (plentiful) and Sheldrakes have been killed. On the 26th Golden Plover were numerous, apparently travelling northward, and, at this early date, one was observed with a good black breast.

Siskins were seen on the 28th February, and again on the 2nd March. On the 5th I saw a Hoopoe at a poulterer's at Chichester, killed on the flooded brooks near Pulborough. On the 31st Curlews were passing N.E. at 4.30 p.m.; wind light S.W.

Our summer visitors were late and irregular in their appearance in this wet and cold summer. The Chiffchaff was first seen and heard on April 1st. On the 11th, with a bitterly cold N.E. wind, a male Redstart appeared in my garden. A pair of Song Thrushes had built a nest and laid four eggs by the 9th April, but forsook them within a few days. We had again a bitterly cold wind, with rain and snow,—nearly two inches of snow covering the ground,—on the night of the 12th. This was probably the cause of the Thrushes' nest being forsaken. I saw no Swallow until the 16th. The Sedge Warbler was first heard on the 25th.

On the 1st May, very cold, first Common Whitethroat seen; 2nd, white frost and strong N.E. wind, Lesser Whitethroat first heard; 12th, weather milder, a single Whimbrel seen passing over in evening, direction N.E.; Whitethroat scarcely heard until now; 13th, first Swift seen; 17th, Whimbrel passing, 1 p.m., N.E., with steady wind from West. On the 18th the Blackcap and Willow Warbler were singing round about my house and garden, as if only just arrived. Buntings (*Emberiza miliaria*) in flock on Walderton Down. The Spotted Flycatcher and Turtle Dove were not seen until the 21st and 23rd respectively. On the 29th of the same month I saw a Nightjar (the first this year) near Havant, hawking for insects along a small brook, at 3 p.m., in bright sunshine, probably just arrived, and hungry.

On the 14th June I observed a pair of Dartford Warblers at Heyshott Common, near Midhurst. On the 15th I saw a Spotted Flycatcher take an insect with its foot and transfer it from its foot to its bill while still on wing. On the 26th a large flock of Swifts, numbering one hundred or upwards, were seen at Havant. On the 27th I saw a Black Redstart.

On the 29th October I obtained an adult specimen (the middle tail-feathers shed) of Buffon's Skua, which had recently been killed in the Manhood, below Chichester, where a second adult specimen was caught in an exhausted condition about the same time.

On the 10th December a Chichester birdstuffer had a great many Long-eared Owls sent in. They seemed to be more numerous than the Short-eared this winter.

In 1880, on the 10th January, I saw a young male Peregrine Falcon, killed at Earnley, at the birdstuffer's. It had in its stomach the remains of a Teal.

A Bittern was killed at Vinnetrow on the 3rd February, and about the middle of March an adult male Shoveller, out of a party of eight, in Bosham Harbour.

With regard to the arrival of summer migrants this year, there is little to be said. Though generally later than the average dates, they were not so irregular as in 1879; but I think that, as to insectivorous birds, if a census could have been taken, the summer population of this district would have been shown to be much smaller than in former years.

A specimen of the Wood Sandpiper was killed at Itchenor on the 10th May; I saw it in the flesh on the 12th.

The first living specimen of the Pied Flycatcher I had ever seen appeared in my garden on the 14th May. My attention was at first attracted by its song, a low warble commencing "zic, zic, zic," very like the same note in the Lesser White-throat, which I at first took it to be. I watched it for some time fitting about among the apple trees, but saw no more of it after that day. With the aid of a binocular I could see no white on the forehead, and the dark parts had a brownish tint; therefore I take it to be a male of last season. Another specimen of the Pied Flycatcher occurred at Appledram near Chichester, where it was shot by Mr. F. N. Hobgen on the 6th May, eight days before mine appeared.

On May 22nd heard Whimbrel passing N. or N.E. at 5 p.m.; wind strong N.W.

On the 22nd August I saw Wheatears and Whinchats at Bosham, on their autumn migration. Yellow Wagtails and Tree Pipits also passing during the previous week.

On the 24th November I examined, in the flesh, two Hen Harriers, *Circus cyaneus*, in the possession of the Rev. A. Fuller, which had been killed on some marshy ground near Sidlesham on the 22nd. The male was in the pure grey dress of adult plumage, and I take the female to be adult also, as I believe it never assumes the grey garb.

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

By JOHN GATCOMBE.

ON May 3rd I observed the first Common Sandpiper on the coast, and two large flocks of Whimbrel flying up the River Tamar. On the 5th a Swift flew in from the sea at a great height early in the morning. By the 7th several Puffins had been sent to Plymouth from Instow, North Devon, for preservation, as also some Cuckoos from our immediate neighbourhood. Great numbers of Whimbrel were nightly heard passing over the town. Swifts were soon pretty plentiful, flying in pairs. A remarkable variety of the Rook was obtained about this time; it was a young bird, with the head, part of the neck, and quill-feathers of the wings pure white; tarsi shining black, but the bill and toes of a beautiful chrome-yellow, with here and there a few black spots; claws white. Young Rooks are often more or less marked with white, but I do not remember having seen one before with such bright chrome-yellow on the bill and feet.*

On May 20th continuous flocks of Martins were observed coming in from the sea, flying against a strong north wind until dusk, and the next day many were to be seen in the town. Several Lesser Spotted Woodpeckers were obtained in the neighbourhood of Plymouth. Up to the end of June, large flocks of the Common Curlew were still to be seen frequenting the mud-

* For some remarks on a Magpie with a yellow beak, see 'Zoologist,' 1867, pp. 706, 757, 826, 877, 913, 1016.—Ed.

banks of the Tamar. In July young Green Woodpeckers seemed unusually plentiful,* and I am sorry to add that many were caught alive and others killed in various ways; I bought one or two of the stronger ones, and gave them their liberty. By the end of the month young Puffins were observed off Plymouth, and one of them was caught by a fisherman with hook and line—a rather unusual circumstance. The man who captured it said that he thought he was pulling up a pretty good fish until he saw what it was.

On August 11th a Spotted Crake and a young Redshank were sent up from Penzance. The bill of the Redshank was wholly of adusky colour, and the legs very dull yellowish orange.

On September 10th several Gannets and Manx Shearwaters were sent to Plymouth, for preservation, from St. Ives, Cornwall; and on the 21st a young Grey Phalarope was shot off St. Ives Head, and another seen the following day, but was not obtained. These were the only specimens of this Phalarope I heard of on our coasts during the past autumn. The person who shot the Manx Shearwaters told me that he saw a small flock of the Greater Shearwater, *Puffinus major*, but could not get near them. Several Terns, Whimbrels, and Knots were killed in the same locality. The Gannets, as is generally the case in the autumn, were found to be in almost every stage of mottled plumage from the young to the adult; indeed I never before saw such pretty varieties.

On September 24th I observed several Redshanks and Dunlins on the mud-banks of the Laira, the latter not having lost the black patch on the breast. Some young Siskins and an adult Snow Bunting were brought to a Stonehouse birdstuffer, both rare species in the neighbourhood of Plymouth; the former were caught alive, in company with a small flock of Goldfinches, and the latter was shot. Possibly the early appearance of these birds may be attributed to the preceding severe cold and fall of snow in Scotland.

By October 9th there were some young White-fronted Geese hanging in the Plymouth Market, and others were said to have been observed at Devonport ten days previously; they did not show any dark bands on the under parts, and the white band at

* See 'Zoologist,' 1880, pp. 149, 221.—ED.

the base of the bill was only partially developed in one of them. On the 12th a fine female Peregrine was trapped near Gnaton Hall, a few miles from Plymouth, which, I think, must have nested in the neighbourhood—most likely in the cliffs by the side of the River Yealm, near the breeding station of the Herring Gulls. A few Swallows and Martins remained with us up to the 16th, and the last Wheatear observed by me was on the 19th. Several Short-eared Owls made their appearance about this date, and some Woodcocks and Widgeon were to be seen in the markets. I also observed two Water Ouzels in the flesh at a birdstuffer's shop, and a young Ring Ouzel about the same time.

On November 27th two Great Northern Divers made their appearance in the Sound, after a severe gale, and were the first I had seen for the season. One was a young bird of the year, but the other a splendid fellow, which had lost but little of his summer dress, the back beautifully spotted, and the bands on the neck apparently perfect, with the exception of a few white feathers which were to be observed about the chin. Adult birds in such plumage are rarely met with in Plymouth Sound at any time, much less so late in the autumn. I am sorry to say the younger bird was quickly killed, and the old one, I fear, mortally wounded, although it managed, with the greatest difficulty, to get away. Notwithstanding that I was daily on the watch, not a single Black Redstart did I see—a circumstance that has not happened to me for at least twenty years, for these birds almost invariably appear during the first week in November, and sometimes before the end of October. I fear many must have been destroyed on their passage across the Channel during the terrific gales of November.

About that date I heard some interesting accounts of storm-driven and fatigued birds alighting on board ship far out of sight of land. A young friend, who had just returned from a long and protracted voyage, told me that, on nearing Ireland, many small birds of various kinds came on board, and among them a Redshank which ran about the deck quite tame. The captain being a humane man and fond of animals, very properly would not allow one of them to be caught or molested in any way, and actually kept the cat shut up in his cabin until the birds left the ship, which they did on coming within sight of land. The men derived much amusement in feeding them whilst they remained

on deck. At one time there were two Owls on board, a white and a brown one, but they did not stay long. The same friend related a still more interesting case:—When nearing the Cape De Verde Islands some time in September or beginning of October, they met numerous Swallows returning southward, and, the weather being fine, the ship's hatches were daily opened to air the cargo, which consisted chiefly of rice, when thousands of small white moths escaped, which were chased and caught by the Swallows which flew in and out between the rigging and under the ship's lee, day after day, in the most wonderful manner. The poor cat in this instance was dreadfully tantalized, not being able to catch one of them, although trying her utmost to do so.

The following was related to a friend of mine by an officer on board H.M.S. 'Northumberland,' one of the Channel Fleet which was sent in search of the missing frigate 'Atalanta' some months since:—After their arrival at Gibraltar, a small brown bird came on board and accompanied them to the Azores, and from thence all the way back to Ireland, leaving the ship in Bantry Bay. Although it generally stuck to the 'Northumberland,' yet it occasionally paid visits to the other ships, and was remarked always to fly on board to leeward. It became well known throughout the fleet, was much petted by the sailors, and, from its tameness and long-continued visit, I was told, caused quite a topic of conversation among the officers, the chief wonder to them being that, after having accompanied them from Gibraltar to the Azores, it should not have left the ship there, instead of remaining throughout the return voyage to Bantry Bay.

On December 4th an adult female Cornish Chough was trapped near the coast, and brought to Plymouth by a woman who said that there were three others in company with it at the time, and that a gentleman on a visit from London tried hard to shoot them, but without success. The stomach of the one trapped contained only a few grains of wheat. Near Plymouth some Hawfinches were seen, a very scarce species in this locality. An immature Peregrine was killed near Totnes on the 8th, and in its stomach I found nothing but some grains of wheat, which no doubt had come from some graminivorous bird which it had eaten. About the 23rd a Little Bustard was observed near Barnstaple, North Devon, and taken to the shop of Mr. Rowe, taxidermist, of that town, by whom it was preserved. It was killed in the

same locality as that in which several Great Bustards were shot at the time of their immigration in 1871. On the 24th I examined an adult common Guillemot, which was in nearly full summer or breeding plumage, the whole head, neck and throat being of a sooty black; such a state of plumage is difficult to be accounted for at this time of the year. Kittiwakes have been very plentiful this winter; but up to the present time I have not seen a single Black Redstart or Kingfisher on the coast.

OCCASIONAL NOTES.

BEAVERS IN NORWAY.—The colony of Beavers noticed on p. 23 is the one mentioned by me in 'The Zoologist' for June last (p. 235) as at "the R—— Bæk, near P——." The names printed on p. 23 are not quite correct. "Voldifjord" should be "Voldsfjord." "Omli on Nedencæs" should be "Omli in Nedencæs."—ALFRED HENEAGE COCKS (Great Marlow, Bucks).

LATE STAY OF THE WHEATEAR IN KIRKCUDBRIGHT.—An unusually late stay of this species recorded at Slogarie, in the Stewartry of Kirkcudbright, on the 7th December last, caused me to address Mr. Robert Service, of Dumfries, on the subject, especially having regard to the occurrence of *Saxicola deserti* of Rüppell this winter at Alloa, as recorded by Mr. J. J. Dalgleish at the meeting of the Royal Philosophical Society of Edinburgh, January 12th, 1880. Unfortunately for us—fortunately for the birds—none were obtained, and so we cannot say if they belonged to the common species or not. The recorder felt positive that they were two of the Common Wheatear which he saw, and which "stayed for a day or two in a young larch and Scotch fir wood, sometimes mixing with a flock of Bullfinches." Finally he reports "they were observed one day flying off northwards." Now Mr. Bruce is a good observer, and may be quite correct in assigning them to our common species; but some of the *Saxicola* are so closely allied that I think it quite possible that one of the rarest Chats, from its similarity to another less uncommon species, might escape observation. Birds on migration are known to have, in some places in 1880, reversed the direction of their line of flight, and have been seen to cross regularly, between August 16th and December 8th, from France to England, instead of from England to France—i. e., going N.W. or N. It is therefore not so curious that the Wigton birds should have been "observed one day flying off northwards," and this may account for the lateness of the

occurrence of the species. Easterly and north-easterly gales succeeded one another for weeks and months in the autumn of 1880, and many interesting and curious results are observable in consequence of the movements of birds, as we hope to show elsewhere later. Whether these birds were Common Wheatears or not, the record is interesting. I regret that specimens were not procured. The arboreal habits and associating with Bullfinches would almost lead one to doubt the accuracy of the observer, were he not so well known as a competent local naturalist. I mention the facts as far as known, as I believe that, however valueless the record may be in itself—however impossible to ascertain now the exact species—still the fact of their “flying off northwards” is alone worth recording, after “staying a day or two in a young larch and Scotch fir wood,” showing pretty conclusively to my mind that they were not merely locally migrating, but were on their grand migration—and that *going northwards*.—JOHN A. HARVIE-BROWN (Dunipace House, Larbert, N.B.).

[We think our correspondent lays too much stress upon these words. The direction in which a bird flies off often depends upon the direction in which it is approached. Again, most birds fly up into the wind in order to attain some elevation before taking any particular course. We are not told what the wind was on the day named. In the case above referred to, the birds were not seen “on passage” flying north, but were observed to stay about a plantation for a day or two. Under the circumstances we are inclined to think that they were simply stragglers which had overstayed the usual period of their sojourn in this country, either from some accident, or perhaps belonging to an unusually late brood. Upon this point Mr. Cordeaux furnishes the following note.—ED.]

With regard to the late appearance of the Wheatear in Scotland, I may state that when at Spurn this autumn I observed a Wheatear on Kilnsea Common on October 26, and I saw a single bird of the species a few days previously in the Great Cotes marshes. Considering the immense number of Wheatears which, in company with Redstarts, visited our east coast, between the Farne Islands and Yarmouth, in the latter part of August and early in September, it is not surprising that some few should have lingered till a late period, more especially when we take into consideration that others of our migrants, notably the Swallow, had been very late in taking their final departure. With reference to the arboreal habits of these late Wheatears, as noted by Mr. J. A. Harvie Brown, they may, I think, not improbably have belonged to that larger race which occasionally passes through our east coast districts in May, and again in the autumn in September and October. These, I have frequently noted, perch as readily on high trees, hedges and bushes as any other of the perching birds, and, in fact, are so very arboreal that they seem to prefer these situations to any other. An

interesting fact shown by the lighthouse returns, and one of which I was hitherto not aware, is that Swallows migrate both by day and by night. On the night of October 7th, from 11 p.m. to 3 a.m., S.S.E., rain, Land-rails, Water-rails, Woodcocks, Ring Ouzels, Common Thrushes, and Swallows (an odd mixture), were seen around the lantern of the Casquets, off Alderney; of these one Land-rail, one Water-rail, four Ring Ouzels, and one hundred Swallows struck the glass. So far as the returns have come in, I have tabulated only one other instance of Swallows seen during night—at the Hasborough lighthouse, Sept. 1st, 2 a.m., fog, “flock of Swallows”; several caught as they beat against the lantern. It is worthy of note that all birds passing the Casquet Lights from August 16th to December 8th,—a fact already alluded to by Mr. J. A. Harvie-Brown,—as a rule, were passing N.W. from the French to the English coast, from Cape de la Hague to the Start Point—a course which seems quite to upset our preconceived ideas of the proper line to be followed by our autumn migrants, and one which I hope to be able to explain at length in our Report on Migration for 1880.—JOHN CORDEAUX (Great Cotes, Ulceby).

THE HOOTING OF THE LONG-EARED OWL.—I have just received two letters from my friends Mr. R. Warren and Mr. W. K. Dover, which, taken together, will afford, I believe, a satisfactory explanation of Mr. St. John's statement. These remarks are so thoroughly to the point that I will leave them to speak for themselves, only premising that it is very remarkable how little is said by our best authorities about the cry of the Long-eared Owl, and it will be seen that St. John and Mr. Dover, both being quite familiar with the hoot of the Tawny Owl, still deliberately describe the cry of the Long-eared Owl, also, as “hooting,” while Mr. Warren prefers to call it “a moan.” Mr. Warren writes:—“With regard to the possibility of the Long-eared and White Owls hooting, the answer will depend upon what each observer considers to be hooting; and upon that there may be as many opinions as hearers. Now, I have not the slightest doubt that St. John, on numberless occasions, heard the Long-eared Owls calling, and may have considered their long-drawn moaning cry to be hooting, but I prefer to call it ‘moaning’; and this cry is very different indeed from what I have heard of the quickly-repeated hoot of the Tawny Owl. With regard to Sir W. Jardine's oft-quoted statement, given as a foot-note in his edition of White's ‘Selborne,’ that the White Owl hoots, I am certain that he was mistaken. He may have shot a White Owl at the time of hearing the sound of hooting proceeding from the place where the bird was, but nevertheless the sound must have come from some Tawny Owl, sitting or flying close by, unperceived by Sir William. Since I was a boy I have noticed the White Owls yearly, and never heard the slightest approach to a call resembling a hoot; nothing but the screech of the adult or the snore of the young birds.

When I first called Mr. Dover's attention to the moan of the Long-eared Owl, he said it did not at all resemble the hoot of the Tawny Owl. I am myself quite satisfied that neither Long-eared nor White Owls ever hoot, in the manner of, or like, the Tawny Owl."

Thus writes Mr. Warren, and we now turn to Mr. Dover. He says:—"It was our friend Warren who first told me what the bird was that I used to hear at night, when on my way to Castle Connor from Ballina. That it was the Long-eared Owl I have no doubt, but, at first, the cry was strange to me. On a fine calm night the bird might be heard for a distance of a mile or two, thus, 'hoo - - - hoo - - - hoo' or 'oo - - - oo - - - oo,' sounded very deep, and not so sharp as the 'oo, oo' of the Tawny Owl: the latter is also silent for two or three minutes or so after each hoot; but, in the case of the Long-eared Owl, two or three seconds only elapse between each hoot. The Tawny Owl is very plentiful here, near Keswick, but the Long-eared very rare. From Sir C. Gore's woods, near Ballina, I have listened to the hoot of the Long-eared Owl continuing for many minutes together, and after a pause resumed, and then ceasing again. The only other cry I have ever heard from it was from the young ones after they had left the nest; this was a sort of scream when they were wanting food from the parent birds, and when I heard this cry, the young ones seemed to be following the old birds about in the wood, and all keeping pretty near together."—A. G. MORE (Dublin Museum of Science and Art).

WINTER VISITANTS IN DEVONSHIRE.—In November last a female Merlin was brought to me which had been shot at Newton St. Cyres, near Exeter, about the 18th of the month, and I secured it for this Museum. We have a male of this species, which was shot near Exeter on August 18th, 1830, and a female taken in a net near Exeter, on September 6th, 1848. One was observed near Sidmouth in September, 1866. One was shot on October 22nd, 1873, having been seen a week previously on Dawlish Warren and at Exmouth. A specimen is recorded in 'The Field' as having been shot on Dartmoor in November, 1879. This little hawk may therefore be considered a rare autumnal and winter visitor to Devon. It is, however, said to have bred near Manaton, on the borders of Dartmoor. Several specimens of the Short-eared Owl reached the hands of the Exeter birdstuffers in November last. This Owl is not uncommon in some winters, such as 1865, 1866, 1867, and 1874. We have a specimen here which was killed in May, 1850, near Exeter. An immature specimen of the Great Northern Diver was killed at Exmouth at the end of November, and was purchased for this collection. Several immature specimens were obtained on the Exe in November and December, 1870, and one on January 16th, 1879. Others, both adult and immature, have occurred on the Exe, in summer as

well as in winter, and we have several adult specimens. My nephew, John Tyrwhitt Drake, shot a young male Red-necked Grebe in the "Bight" off Starcross, in the estuary of the Exe, on the 8th January, 1881, and has presented it to this Museum. It has two longitudinal black stripes on the sides of the head, and the sides of the neck and upper part of the breast are light red. The iris was very narrow, and of a light colour; it was not visible unless the skin round the eye was lifted. I have never seen a specimen in this state of plumage before. I obtained an immature example in December, 1852, being one of two which frequented a flooded marsh near Topsham for a week. They were very shy and swam about in company, keeping well in the centre of the sheet of water, so that it was not until after many attempts that one was at last killed. We have another immature specimen from the collection of the late Mr. Ross, which was obtained near Topsham in 1850. Neither of these have any red on the neck, nor black stripes on the head. Immature specimens were obtained on the Teign in February, 1870, and in Torbay in 1871.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

LITTLE BUSTARD IN NORTH DEVON.—On the 17th December I was in Barnstaple, and, according to my usual custom, went into the shop of Rowe, the gunmaker and birdstuffer, to enquire if any uncommon birds had been brought to him lately. He told me he had just stuffed a Little Bustard, which had been shot on the 6th December near North Tawton, by Mr. W. D. Salter. I went up to the workshop, and was there pleased to see a very fine and well-stuffed female specimen of this scarce bird. Mr. Rowe was unable to give me any information as to how it was obtained, so the next day I wrote to Mr. Salter, and asked him if he would kindly furnish me with the particulars of its capture, and the following is an extract from the letter I received from him in reply:—"I was riding through my turnip-field, looking at my sheep, when I flushed the bird. I did not see it until it was on the wing. It flew three or four gun-shots and then pitched again in the same field. I was leaving the field when a foxhound puppy, which was in the next field with one of my men, caught sight of me and came galloping through the turnips towards me and put up the bird again, and it flew back to about the same spot from whence it first rose. I then trotted home, a distance of about a mile, where I was detained some twenty minutes, got my gun, and returned to the turnip-field. The bird was then sitting down, apparently resting; it was very tame, and let me get within very easy shot without moving. I had not the least idea what it was, but from a description in a book I concluded it was a female Little Bustard or a young male. I should like to know which, if you will kindly tell me. Some men who were ploughing, a field or two off due east, saw it fly over a short time before I first flushed it. It was then about half

a gun-shot high, and they told me it was flying or skimming something like a hawk. It passed very close to them. I concluded myself it had had a long flight, and had stopped to feed in the turnips and rest. The weather was fine, and, as far as I can remember, the wind was south-west, but not a strong wind. When I rose the bird its flight seemed rather laboured, or, as I thought, like a bird not accustomed to flying very much. . . . The field in which I killed it is within a quarter of a mile of the town of North Tawton, and with no uncultivated ground near it." Since receiving this letter another example of the Little Bustard, a female, has been obtained in the neighbourhood of Braunton, and has also been preserved by Mr. Rowe. I had the pleasure of seeing both the birds together, and they make a beautiful pair. My brother, the Rev. Murray A. Mathew, has had the good fortune to add this second bird to his collection.—GERVASE F. MATHEW (Instow, N. Devon).

SURF SCOTER IN ORKNEY.—A Surf Scoter was shot at Stromness on October 23rd, and as I had the opportunity of examining the body of the bird I should like to make a few remarks on the differences between the trachea of this species and that of the Velvet Scoter, for all the books to which I have access give either no description, or else a very imperfect one. I know it is dangerous to draw inferences from a single specimen, but as the Surf Scoter is so rare a bird in this country it is unlikely that I shall have another opportunity of examining its trachea. Yarrell, in the third edition of his 'British Birds,' says:—"According to the description given, the trachea of the Surf Scoter resembles that of the Velvet Scoter." This is to some extent correct, but I shall point out that there are some very marked differences. In Wilson and Bonaparte's 'American Ornithology' there is this description:—"There was a singular hard expansion at the commencement of the windpipe, and another much larger about three inches above where it separates into the two lobes of the lungs; this last was larger than a Spanish hazel-nut, flat on one side and convex on the other." This would do for a description of the trachea of the *Velvet* Scoter, but in the *Surf* Scoter the larger expansion is *not* three inches from the bifurcation of the trachea, neither is it *flat* on one side. I will now give the measurements of the trachea of the Surf and Velvet Scoters, side by side, for comparison:—

	<i>Velvet Scoter.</i>	<i>Surf Scoter.</i>
Total length from rima glottis to bifurcation .	9 $\frac{1}{4}$ inches.	8 inches.
Length of upper dilatation, measured at centre	$\frac{7}{8}$ "	$\frac{5}{8}$ "
" from upper dilatation to bulb in trachea	4 "	4 "
" of bulb in centre	$\frac{7}{8}$ "	$\frac{6}{8}$ "
" of trachea from bulb to lower dilatation	2 $\frac{1}{16}$ "	$\frac{9}{16}$ "
" of lower dilatation measured at centre .	$\frac{6}{16}$ "	$\frac{8}{16}$ "

Taking the several dilatations separately, we get the following relative proportions:—1st. *The upper dilatation*, which is situated almost immediately below the rima glottis, is in the Velvet Scoter little greater in circumference than the trachea, whereas in the Surf Scoter the lower edge bulges distinctly beyond the trachea both at the sides and in front; in both the back of the dilatation is in the same straight line as the trachea, and the tracheal rings can be distinctly seen all down the back of the dilatation.

	<i>Velvet.</i>	<i>Surf.</i>
Length	$\frac{7}{8}$ inch.	$\frac{8}{8}$ inch.
Width	$\frac{8}{8}$ "	$\frac{3}{4}$ "
From before backwards	$\frac{1}{2}$ "	$\frac{1}{2}$ "

The bulb.—This in the Velvet Scoter is a trifle longer and narrower than in the Surf Scoter; and whereas it is *flat* behind and slightly convex in front, in the Surf Scoter is markedly *concave*, from side to side behind, and very convex anteriorly, seeming almost as if divided into a central lobe with one lateral one on each side.

	<i>Velvet.</i>	<i>Surf.</i>
Length in centre	$\frac{7}{8}$ inch.	$\frac{9}{8}$ inch.
Width	1 "	$1\frac{1}{8}$ "
From before backwards	$\frac{1}{2}$ "	$\frac{1}{2}$ "

The lower dilatation, which is situated just at the bifurcation of the trachea into the two bronchi, is wider and shorter in the Velvet than in the Surf Scoter, and, when viewed from behind, seems almost to bifurcate in the former; but in the latter the edge is nearly straight.

	<i>Velvet.</i>	<i>Surf.</i>
Length in centre	$\frac{6}{16}$ inch.	$\frac{9}{16}$ inch.
Width	$\frac{13}{16}$ "	$\frac{10}{16}$ "
From before backwards	$\frac{5}{16}$ "	$\frac{6}{16}$ "

By these measurements it will be seen that the most marked differences in the two tracheas are to be found in the relative shapes of the dilatations at the commencement and termination of the trachea, and of the bulb; and the great difference in the length of trachea below the bulb, there being twenty-five tracheal rings in this situation in the Velvet, and only seven in the Surf Scoter. There is one other difference I would point out, and that is a very marked one: it lies in the pair of muscles which are attached to the lower part of the bulb; in the Velvet Scoter they are long and attenuated, measuring only one-sixteenth of an inch in breadth; but in the Surf Scoter they are short and strong, measuring five-sixteenths of an inch in breadth. Messrs. Pratt & Son have set up the bird in their usual correct style. I also have to record the capture of a Lapland Bunting on October 31st, and of a Cirl Bunting about a week before; both were taken at Portobello, a coastguard station a few miles to the east of Brighton.—HERBERT LANGTON (Brighton and Hove Dispensary).

ORNITHOLOGICAL NOTES FROM NORTHAMPTONSHIRE.—I am informed by Mr. W. Tomalin, of Northampton, in a letter dated December 9th, that a specimen of the Great Grey Shrike, *Lanius excubitor*, was shot about three weeks before that date, in Midsummer Meadow, in the town of Northampton. About the end of December last I received a fine living specimen of this species from Mr. W. Taylor, of Kettering, who informs me that he obtained it from a birdcatcher, who captured it near Glendon, Northamptonshire, by means of a limed twig, on November 19th. This bird appears to me to be a young one of the year, and is still alive, in good health and plumage. I notice that when I give him a piece of meat too large to be swallowed at once, he does not stand upon and tear it to pieces, after the manner of the *Falconidæ* in like cases, but holds it grasped in one foot, and picks it to pieces in the same way as does the Scops Owl, *Scops aldrovandi*, of which species I have a pair alive by my side as I write these lines. This Shrike is a voracious feeder, but will not eat much at a time; he is very fond of mealworms, which he takes readily from my hand. Mr. W. Tomalin has recorded in 'The Field' of December 11th, and given me private information of, the occurrence of a Shag, *Graculus cristatus*, which was shot on the 2nd of that month from the chimney (175 ft. high) of the Gayton Brick and Tile Works, five miles west of Northampton. He adds that he had heard that two other birds of this species were shot the week before this occurrence at Yelvertoft, in Northamptonshire.—LILFORD.

ROUGH-LEGGED BUZZARDS IN THE STEWARTRY OF KIRKCUDBRIGHT.—I have heard of the occurrence of five Rough-legged Buzzards in the Stewartry, and one at Blackwood, in Dumfriesshire, during the past autumn. The latter, and four of the Stewartry birds, I had an opportunity of examining in the shop of Mr. Hastings, our local taxidermist. They are all noble specimens; two of them are very dark in colour, and the other three are considerably lighter. The dates and localities are as follow; so far as I can learn:—29th October, parish of Southwick, two; Blackwood (Dumfriesshire), one; 5th November, Newabbey, one; 9th November, near Castle Douglas, one; 24th November, Newabbey, one. It is perhaps worth noting that Newabbey and Southwick are both seaboard parishes. The Rough-legged Buzzards were very probably accompanied by a flight of Common "Gleds," as I have heard of numerous "Gleds" being seen and shot. Three of those I examined were Common Buzzards, but doubtless some of the others would be the Rough-legged species. In spite of continued persecution by keepers and shepherds, the Common Buzzard still breeds in several localities in the north-west of the Stewartry, but I do not think those that have been seen and procured during the last two months were native-bred birds.—ROBERT SERVICE (Maxwelltown, N. B.)

SWALLOWS IN DECEMBER.—The appearance of Swallows in this country in December, although by no means unprecedented (for several such instances have been recorded), is nevertheless sufficiently unusual to deserve notice. During the past autumn the late stay of Swallows was the subject of general remark, and it may be as well therefore to place on record, for future reference and comparison, some of the latest dates at which these birds were observed in 1880, together with such remarks concerning wind and weather as were noted at the time by the observer in each case. I accordingly append the following reports which have reached me:—

Lymington, Hants	. Nov. 22.	11 degrees of frost.
Dublin	„ 22.	Snow on ground.
Penzance	„ 23.	Stormy and cold.
Falmouth	„ 27.	{ A bitter cold and stormy day. During previous 14 days high N. and N.E. winds, with hard frost and ice $\frac{1}{4}$ in. thick.
Portscatho, Cornwall	„ 29.	
Bournemouth . . .	Dec. 7.	One seen, middle of day; no sun.
Eastbourne	„ 11.	Two seen.
Walmer	„ 11.	One seen; light N.W. wind.
Henley-on-Thames .	„ 18.	A Martin seen; sun shining.

The above facts speak for themselves. It will be observed that, with one exception, all the birds were seen in the South of England. In the Isle of Wight, as I am informed by Capt. Hadfield, the last Swallows in 1880 were observed at Ventnor on November 17th.—J. E. HARTING.

KING EIDER AT THE FARNE ISLANDS.—The note on the King Eider at the Farnes (Zool. 1880, p. 514) leaves it open to doubt whether the birds mentioned by the light-keeper really were King Eiders, and Mr. Cordeaux has asked me to supplement his remarks with the following notes of my own taken while at Bamburgh last summer. On June 7th I went out to the Farnes with a North Sunderland boatman, who told me that he had seen a King Eider and duck near the islands a few days before. I asked him to keep a look out, and to let me know if they remained in the neighbourhood. On the 9th we were again at the islands, and when about half a mile past the Inner Farne the boatman pointed out a light-coloured duck swimming with several common Eiders, and said, "That is the duck the King Eider is generally with." We could not distinguish at the distance whether the male King Eider was in the flock, and at our approach they all made off in an opposite direction. I saw the boatman a few days afterwards, and he assured me that on one or two occasions he had been quite near to the King Eider, and immediately recognised it as being similar to one he had shot seven years ago, mentioned by Mr. Hancock in his 'Catalogue,' and referred to by Mr. Cordeaux. Is it not possible that the "cream-coloured duck" may be a variety? I believe my informant to be a thoroughly

reliable man, and since writing the above have heard from him as follows:—"I have not seen the King Eider this winter, and I don't think he has been seen by any one upon our shores since last summer."—T. H. NELSON (North Bondgate, Bishop Auckland).

EIDER DUCK ON THE SUSSEX COAST.—Messrs. Pratt & Son, of North Street Quadrant, have on view an immature male Eider Duck. The bird, which has some whitish feathers on the shoulder and lower part of the neck, settled on some rocks off Rottingdean on the evening of January 3rd, and stopped there all night. On the morning of the 4th Mr. Guthrie, of Rottingdean, went off in a boat, and after a long chase succeeded in obtaining it. I examined the body, and fancy it must have been wounded before, as there were signs of old peritonitis on the right side of the abdomen. Knox, in the third edition of his 'Ornithological Rambles in Sussex,' says of the Eider Duck:—"A very rare wanderer from the north. An immature specimen was shot by Serjeant Carter, in November, 1830, at Chichester Harbour, and two were killed some years ago, associated with a flock of Brent Geese, on Rye marsh." Since then I can hear of no other recorded instance of an Eider Duck being shot in Sussex.—HERBERT LANGTON (Brighton).

BIRDS ROOSTING IN REEDS.—Two years ago I reported having observed Grey Wagtails roosting by the side of a lake amongst reeds in Co. Donegal (Zool. 1878, p. 890). Since then I have noticed at Lough Fern, in the same county, immense quantities of Starlings taking up their night-quarters in a similar way. This observation has been made at Lough Fern before, by Mr. R. J. Montgomery, in the year 1858 (Proc. Dubl. Nat. Hist. Soc., vol. ii., p. 82). He mentions that they had resorted there for a great many years, and expresses surprise, as he had elsewhere found them "very capricious with regard to their roosting-place," but Lough Fern still presents irresistible attractions to these birds. Mr. Montgomery states that the Starlings commence going to this lake for the purpose of roosting in November. It was at the end of September when I observed them. On August 24th last, when making my way from the Bluestack Mountains to the Gap of Barnesmon, in the south-western part of Donegal, I came upon a mountain lake named Lough Sallagh, in a very remote district. Nevertheless there was a cottage hard by. It was dusk, and as I came near the edge of the lake I heard a low concert of myriads of notes mixed up in a confused medley issuing from the reeds along the shore. This sound proceeded from a vast number of Swallows which had just arrived and settled down amongst the reeds for the night; and I was informed by the owner of the cottage that they came there at that time of the year, for about a month, every evening. They clung sideways, so as to be in a vertical position, to the stems of the reed, often many upon the same stem, as I noticed in the case of the Wagtails; and from their coming

so regularly to the same lake it may be inferred that this host was the gathered assemblage of Swallows from a considerable district, and that such resorts could not therefore be numerous. It is doubtless this habit of roosting over the water, before migration, that has given rise to the superstition about their subaqueous hybernation.—HENRY CHICHESTER HART (Dublin).

STARLING HAWKING FOR FLIES.—Amongst the Natural History Notes included in the last published Report of the Committee of the Queenwood College Mutual Improvement Society is one which relates to the actions of a tame Starling, which was taken when young by one of the students from a hole in an ash-tree growing in a chalk-pit near Queenwood. This bird, after being a short time in confinement, was allowed its liberty, and became very tame and fearless. It would come to its owner's whistle, and one of its favourite amusements was hawking for moths and butterflies. Perched on its master's wrist, it would wait until a passing insect attracted its attention, and would then swoop off and return with the captured prey to its post of observation. The same thing has been done with the Great Grey Shrike. Starlings being easily procurable, perhaps some of the readers of 'The Zoologist' may next summer like to make a similar experiment.—J. E. HARTING.

RED-WINGED STARLING IN HERTFORDSHIRE.—A bird of this species, now in the possession of Mr. Norman Evans, of Nash Mills, was shot in the spring of 1879 near Bovington. I have recorded the occurrence in some "Notes on Birds" communicated to the 'Transactions of the Hertfordshire Natural History Society' (Dec. 1880), but as the Red-winged Starling is amongst the rarer stragglers to the British Islands it may be well to let the fact of this recent occurrence be made more widely known to ornithologists.—J. E. LITTLEBOY (Hunton Bridge, Watford).

GREAT NORTHERN DIVER IN SOMERSETSHIRE. — On January 21st I received a specimen of the Great Northern Diver which had been shot on a reservoir at Barrow, near Bristol, on the previous day. It was a young male, in winter plumage; weight 6 lbs. 10¾ ozs. Its stomach contained a small quantity of vegetable matter. The weather here is intensely cold, as many as twenty-three degrees of frost having been recorded, and the country is covered with snow.—ROGER FORD (Wraxall Court, Nailsea).

DOTTEREL IN CORNWALL.—Two specimens of the Common Dotterel, *Charadrius morinellus*, were killed by one of the keepers of the lighthouses at the Lizard on April 28th, 1880. They were shot by him from one of the towers whilst hovering around the lantern, being attracted by the electric light; this was between 2 and 3 a.m. Both birds are now in my collection. As the Dotterel is seldom met with in Cornwall, its occurrence here may be worth recording.—HERBERT PASSINGHAM HART (Polbrean, The Lizard).

STARLING AND STOCK DOVE LAYING IN THE SAME NEST.—In May and June, 1878, I found near York the nest of a Stock Dove, *Columba ænas*, in the decayed branch of an elm, quite hollow, and about four feet deep and fifteen feet from the ground. When found, there were two eggs of the Stock Dove and four of the Starling laid on the same level. A little straw (most probably introduced into the hole by the Starling) was the only resemblance to a nest. The fact of these birds laying together may be accounted for by the Starling being the pioneer, and the Stock Dove having taken forcible possession of the tenement. All the eggs were taken, and in the following month of the same year (1878) a similar occurrence took place, three eggs of the Starling and two of the Stock Dove being found in the same place. The Stock Dove's eggs were hatched. In the following year (1879) the Stock Dove again laid in the same place, but this time alone, the Starling (if alive) having doubtless despaired of ever rearing its eggs. The hen Stock Dove was captured on the eggs and killed. The cock bird, however, got another mate, and the pair successfully hatched and reared the young, which, I need hardly say, were left to them. There was no recurrence of the kind in 1880.—W. HEWETT (26, Clarence Street, York).

[The Stock Dove not unfrequently nests in the hollows of trees, especially pollards, and we have several times found the nest in a ruin amongst ivy; but the fact of a pair of these birds occupying a hole in partnership with a pair of Starlings is curious. In 'The Zoologist,' 1875, p. 4539, is a note of a Stock Dove laying in a Magpie's nest; and a similar instance is recorded Zool. 1876, p. 4875, in the case of a Wood Pigeon.—ED.]

BRAMBLING IN THE ISLE OF WIGHT.—Towards the end of November a handsome male of this species was captured here in a clap-net, with Sparrows, and brought to me for identification, the Brambling being a rare bird here.—HENRY HADFIELD (High Cliff, Ventnor).

BREEDING RANGE OF THE SNOW BUNTING.—I observe that Mr. Cordeaux, in his interesting article on the Snow Bunting in your January number, says that the breeding quarters of this species extend from near the Pole as far south as latitude $56^{\circ} 40'$ North, in the British Isles. Hence I infer that hitherto this has been considered its recognised limit. On one of the highest and wildest passes of the Maritime Alps, between 44° and 45° N. latitude (I do not specify the locality, in order to protect the subject of this notice), there stands a small cabin for the refreshment and shelter of wayfarers. In the month of June, 1872 (June 4th), I was botanizing on the neighbouring summits, and, having come to this small refuge to get something to eat, I saw as I approached the place a Snow Bunting running over the rocks in front of me. Its extreme tameness surprised me, for it allowed me to get within a few feet, and seemed quite

indifferent to my presence. This bird was a female. While I was eating my luncheon in the house I saw another bird fly to the window-sill, leave it again, and return. This was a male Snow Bunting. On going outside I at once saw the birds passing backwards and forwards, and entering a crevice underneath the sill of the window. My first impulse was to try to get at the nest, but to this, I am now glad to say, the owner objected, telling me that the birds had built there regularly for several seasons, and that he did not wish them to be disturbed. This brings the breeding range very much farther south than has been hitherto ascertained, so far as I can gather from the accounts of Gould, Yarrell, and others. — W. OXENDEN HAMMOND (St Alban's Court, Wingham, Kent).

FOOD OF THE SNOW BUNTING.—On December 13th I skinned a pair of Snow Buntings that had been procured on the summit of one of the hills, in the parish of Balmaghie, in this county, and on examining the contents of their stomachs I was surprised to find them filled with Lepidopterous caterpillars, twelve being contained in one of the stomachs and fifteen in the other. Although these were not “fine specimens” from an entomological point of view, I had no difficulty in identifying them as the larvæ of *Noctua xanthographa*, a common moth in the district. I was under the impression that the food of the Snow Bunting was preferably of a vegetable nature, and in this locality there could have been no difficulty in getting abundance of grass, seeds, &c.; yet the birds seem to have preferred the insect food.—ROBERT SERVICE (Maxwelltown, Kirkeudbrightshire).

SNOW BUNTINGS IN CO. KILDARE.—On the 13th January at the Curragh Camp I noticed several Snow Buntings busily employed in pecking about amongst the horse-droppings on the roads in search of hay-seeds and oats. I was particularly struck by their tameness, which quite equalled that of the House Sparrow, for they were in the most frequented part of the camp; even a band, marching along playing, only caused them to fly on to the top of the nearest hut, to alight again and pursue their quest for food as soon as it had passed. No doubt they have been driven from the Wicklow hills by the present severe frost.—E. F. BECHER (The Barracks, Newbridge).

RAPTORIAL MIGRANTS NEAR CROMER.—On November 25th I saw a large hawk at Hempstead ponds, which I have no doubt was an Osprey. This is the seventh Osprey which is known to have occurred at these ponds. It has been observed several times by the keeper, and last week was seen to catch a fish at the Felbrigge pond. On the 30th the remains of a Hen Harrier, picked up in a wood, were brought to me at Northrepps. About December 7th a Rough-legged Buzzard was picked up dead at Bodham. Another was also shot near Cromer since my last communication, but I could not ascertain exactly where. I saw them both in the flesh. It seldom

happens that one gets so good an opportunity of inspecting Rough-legged Buzzards as Norfolk naturalists have had this year. Among all the specimens reported to me there has only been one which in plumage approached the adult state.—J. H. GURNEY, JUN. (Northrepps, Norwich).

EARLY ARRIVAL OF THE CHIFFCHAFF IN IRELAND.—When driving from Killarney to Kenmare, on the 20th of March last, I heard a good many Chiffchaffs. There are, however, many records of its song being heard at an earlier date. The following extract from a letter lately received from a good observer living near Cork may be worth record. He says:—"I think I mentioned in the beginning of this year that I had shot a specimen of the Chiffchaff on the 22nd of February. The little creature made me aware of its presence one frosty morning by repeating its well-known call three or four times in an alder bush, when I killed it." Could it be possible that the bird had remained all the year in the country? I suppose so. See Yarrell's 'British Birds,' 4th ed., p. 439.—WILLIAM W. FLEMING (18, Upper Fitzwilliam Street, Dublin).

SHOVELLER IN OXFORDSHIRE.—In March last, or perhaps rather later in the year, a pair of Shovellers were seen on Otmoor, in this county; the male, I am sorry to say, was shot. It is possible that they might have bred there if undisturbed. A bird of the year was killed in the same place in October. The Rev. J. W. Falcon (to whom I am indebted for the information) says of the former, "It was killed in the middle of Otmoor, a habitat just suited to it. . . . Otmoor is in winter, and often all summer, a swamp of from 2000 to 3000 acres." He adds that the bird is sufficiently well known there (as a winter visitor) to have the local name of "Spoon-bill."—OLIVER V. APLIN (Bodicote, near Banbury).

BUFF VARIETY OF THE COMMON SNIPE.—A pretty variety of the Common Snipe was shot early in December at Omagh, and forwarded to us for preservation. The prevailing colour is buff, with traces of the characteristic markings which are seen in normal specimens of the Common Snipe.—WILLIAMS & SON (Naturalists, Dublin).

GREY PHALAROPE IN SUSSEX.—I have to record the occurrence of a bird of this species, which was shot in "The Nook," at Rye, on the 16th November last. It has been preserved, and is now in possession of Mr. Bristowe, naturalist, of the Norman Road, St. Leonards-on-Sea.—THOMAS PARKIN (Halton, Hastings).

SISKIN IN CORNWALL.—On November 10th a specimen of the Siskin, *Fringilla spinus*, was shot at the Lizard by Mr. J. H. Drage. As this bird is seldom met with in Cornwall, except sometimes in winter, its occurrence may be worth recording in 'The Zoologist.'—H. PASSINGHAM HART (Polbreen, The Lizard).

STORM PETREL NEAR WENDOVER.—A specimen of the Storm Petrel was picked up near Wendover, and brought to me about the middle of November last. It had been dead for some time, and was quite dried up.—H. HARPUR CREWE (Drayton-Beauchamp Rectory, Tring).

GREAT NORTHERN DIVER NEAR BARNSTAPLE.—About the end of the last week of November two very large examples of the Great Northern Diver were shot on the River Taw, near Barnstaple. These birds are nearly in full summer plumage, only a few grey feathers appearing on the head and throat.—GERVASE F. MATHEW (Instow, North Devon).

NIGHT HERON AT DOVERCOURT.—A female Night Heron, now in my collection, was shot at Dovercourt, near Harwich, on the 29th November last. It is in the immature or spotted plumage, and weighed one pound eleven ounces. It has its middle claw serrated.—F. KERRY (Harwich).

GOLDEN EAGLE IN CO. DONEGAL.—We are sorry to have to record the death of a Golden Eagle, which was shot at Killibegs, Co. Donegal, on November 22nd.—WILLIAMS & SON (Naturalists, Dublin).

THE CUCKOO RAY.—I have more than once expressed my belief that the Cuckoo Ray is nothing more than an accidental, and very handsome, variety of the Homelyn Ray. On November 27th I obtained a specimen of a Ray with the most distinct markings of "Cuckoo" Ray that I have ever seen. The distinguishing spot of the "Cuckoo" on each wing was most distinct. The spots of the Homelyn (usually faintly seen in the "Cuckoos" which I have observed) were not to be seen at all in this specimen, but in all other respects the similarity between this specimen and the acknowledged Homelyn is so great that I cannot abandon my belief that the Cuckoo and the Homelyn are "the pretty one" and "the plain one" of the same family.—THOMAS CORNISH (Penzance).

ON THE FLIGHT OF THE FLYING-FISH.—Having been much in tropical seas, and crossed the equator twelve times, and seen thousands and tens of thousands of Flying-fish, I may perhaps be allowed to offer a few remarks on an article upon this subject in 'The Zoologist' for November last (Zool. 1880, p. 471). The writer, after ten days' experience, claims to have settled the somewhat vexed question as to whether this fish actually flies or is "carried parachute-like" before the wind; and another point has been determined to his own satisfaction, that of its flying against the wind, for he says, "In case of a breeze, the direction of flight, as a rule, was either against that of the wind, or formed a more or less angle with it." But I have no recollection of ever seeing one fly against the wind. To enable it to do so the muscular power of the pectoral fins must be great indeed, exceeding that of the wing of a Storm Petrel, considering the body to be

propelled, the former greatly outweighing the latter. Why, may I ask, should the fish have been endowed with such power? Not to escape foes in the water or out of it, as it would be less likely to fall a prey to either bird or fish by flying with the wind. He speaks of its "dipping the caudal lobe in the water" to aid it in its flight; but I do not think that would enable the fish to rise again. Dr. Kneeland says "the tail acts like a spring," and so it may when the fish is *in* the water. Dr. Pettigrew remarks that "their flight or leap is indicated by the arc of a circle." Mr. Whitman, on the contrary, says, "the flight, executed in a horizontal plane, is seldom raised above the surface of the water by more than two or three feet." With more experience he might have seen them at ten times that height above the water; in proof of which they not unfrequently drop on the decks of large vessels. Though mostly injured by contact with spars or rigging, some, I think, might be secured alive if immersed at once in tub or bucket, affording better specimens for examination than the alcohol-soaked fish experimented on by Prof. Möbius. As to distance of flight, I think it greatly underrated by Mr. Whitman, who speaks of eight hundred feet as a "remarkable long flight," but I believe the fish covers double that distance when driven by a gale, and then I think it must close the pectoral fins to enable it to alight. He speaks of the observer's eye being sharpened by experience, but that can hardly be acquired in a few days, it being difficult to judge distances at sea, particularly when rough. In referring to observations made when the sea was perfectly smooth, Mr. Whitman says that the fish rise from the water by "a flapping of the pectorals, while the ventrals were held in quiet expansion"; whereas Dr. Pettigrew speaks of "the velocity acquired by the vigorous lashing of the tail in the water to the air." I have been in ships becalmed for weeks in the tropics, and believe, as Dr. Pettigrew says, that there must be a lashing of the tail in the water to aid the fish in rising—not that I think it could be propelled many feet by it or fly far unaided by the wind; but that they are endowed with some power of flight, even when calm, is self-evident, or they would fall an easy prey to Albicore, Bonetta, and other fish.—HENRY HADFIELD (High Cliff, Ventnor, Isle of Wight).

RED MULLET OFF THE CORNISH COAST IN DECEMBER.—I have had reported to me the capture, on December 9th, of a large Red Mullet, *Mullus surmuletus*, off the Gear Rock, in Mount's Bay, about one mile from the shore and in four fathoms water on a rocky bottom. I did not myself see the fish, but I have no doubt that my informant is correct as to the species. The late occurrence of this fish in our bay shows that it is present all the year round. I have now taken or received this fish in April, and thence in every month to December, and in that month twice.—THOMAS CORNISH (Penzance).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

December 2, 1880.—Prof. ALLMAN, F.R.S., President, in the chair.

Nine gentlemen were balloted for and elected Fellows of the Society, viz.:—Messrs. F. Arthur Canton (London), Charles B. Cory (Boston, U.S.), Charles Fawcett (New South Wales), Charles L. Jackson (Bolton), Paul H. M'Gillivray (Victoria, Australia), R. W. Emerson M'Ivor (Melbourne, Australia), and Ernest L. Sellon (Kensington, S.W.).

A resolution of Council proposing certain alterations in the Bye-Laws was read.

Mr. George Brook exhibited specimens of the phosphorescent *Noctiluca miliaris*, taken from the surface of the sea at the mouth of the Thames, and immediately thereafter placed in a weak solution of osmic acid, when shape, &c., was perfectly retained.

Prof. T. Spencer Cobbold drew attention to a specimen of a rare Chinese fluke (*Distoma sinense*), showing the internal organs, especially the vitellary sacs, ova, and reproductive parts generally.

A paper, "Notes on British Tunicata" (Ascidiidæ, part i.), by Mr. W. A. Herdman, was read by the Secretary. The simple Ascidiæ in the present family have generally a non-folded branchial sac with internal longitudinal bars, an eight-lobed branchial aperture and six-lobed arterial aperture. Of the British genera *Ciona*, *Ascidia*, and *Corella*, the first and third have a series of languets along the dorsal edge of the branchial sac, whilst the second has a continuous lamina; the first two agree in the straight stigmata of the branchial sac as distinguished from the third, in which it is curved. Each differs, moreover, in the course and position of its alimentary canal. Describing the latter peculiarities, aided by diagrammatic figures, the author thereafter proceeds to treat of a number of species of the genus *Ascidia*; among others the following six are recognised as being new, viz., *A. lata*, *A. fusiformis*, *A. truncata*, *A. triangularis*, *A. Patoni*, and *A. innominata*. The series was obtained at Loch Long and Arran in Scotland.

The seventh contribution to the Mollusca of the 'Challenger' Expedition, by the Rev. R. Boog Watson, was read in abstract. This contains descriptions of species of the genera *Ælis*, *Fenella*, and *Dunkeria*, family *Pyramidellidæ*; of the genus *Oniscia*, family *Cassidia*; and of the genera *Triton*, *Ranella*, and *Nassaria*, family *Tritonidæ*.

December 16.—Prof. ALLMAN, F.R.S., President, in the chair.

Messrs. H. A. Erlebach (Mill Hill), T. F. Inman (Bath), and Dr. W. A. Herdman (Edinburgh), were elected Fellows of the Society.

The President announced that the meeting would be made special, for the election of a new Member of Council. The ballot-box was then sent

round, and the scrutineers appointed found on examination that Mr. Charles Baron Clarke was duly elected a Councillor. The proposed alteration of the Bye-Laws was read for the second time.

The only zoological contribution read at this meeting was "On the Land-Molluscan Genus *Durgella*, with notes on its Anatomy and description of a new Species," by Lieut.-Col. H. H. Godwin-Austen. *Durgella* was founded by Mr. W. T. Blanford in 1863, and his paper was the first attempt to classify the Indian land-shells by the form of the animal and structure of the foot, besides being valuable as regards their distribution. The genus contained three species, *D. levicula*, Bens., *D. mucosa*, Blandf., and *D. seposita*, Bens. The type, *D. levicula*, is now in the Cambridge Museum. From examination of living specimens, and as compared with the type, Col. Godwin-Austen is satisfied of the distinctness of the genus, it having but a distant relationship with *Girasia*, *Macrochlamys*, &c. He doubts, however, if the species *mucosa* ought to be placed in the genus; and states that if the species *seposita* is the same as his *bilineata* from the Dufra Hills, as Mr. G. Nevill asserts, it must also be removed, for the latter is a true *Macrochlamys*. *Durgella* has a very remarkable odontophore, quite unlike any other Indian species of the *Zonididæ*. The author treats further of its anatomy, and characterizes the genus afresh, describing *D. Blanfordi*, from Assam, as a new species.

Two papers were read by Mr. Francis Darwin, viz., "On the Theory of the Growth of Cuttings, illustrated by Observations on the Bramble," and "On the power possessed by leaves of placing themselves at right angles to the direction of incident light."

January 20, 1881.—The Rev. J. M. CROMBIE, F.L.S., in the chair.

The proposed alterations in the Bye-Laws were again successively read and confirmed, excepting Sect. 2, chap. viii., which was not confirmed.

A Squirrel's nest from a holly bush was exhibited by Mr. Charles Berjeau, and in his remarks thereon he mentioned he could find no specimen of this rodent's arboreal domicile either in the British Museum or other London collections.

No zoological papers were read at this meeting, but several researches on orchids, ferns, &c., were communicated by Fellows of the Society.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

December 14, 1880.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of November, amongst which special attention was called to two Matamata Terrapins, *Chelys matamata*, and a Uniform Water Snake, *Fordonia unicolor*, obtained by purchase.

Mr. Sclater exhibited and made remarks on a skin of a brown female *Pauxis galeata*, formerly living in the aviary of the late Mr. G. Dawson Rowley.

Dr. A. Günther exhibited and made remarks on a skin of a new species of *Rhynchoeyon* from Eastern Africa, discovered by Dr. Kirk.

Prof. T. H. Huxley read a paper on the application of the laws of evolution to the arrangement of the Vertebrata, and more particularly of the Mammalia.

Lieut.-Colonel H. H. Godwin-Austen read a paper on the anatomy of *Ferussacia gronoviana*, Risso, from Mentone, pointing out its general relationship with *Lovea tornatellina*, Lowe, of Madeira, and with *Ferussacia follicula*, Gronov., from Algiers.

Mr. Arthur G. Butler read a paper on a second collection of Lepidoptera made in Formosa by Mr. H. E. Hobson. Thirty-three new species were found in this collection.

Mr. Oldfield Thomas read a paper containing the descriptions of a new species of *Reithrodon* obtained in Venezuela by the late Mr. D. Dyson, which was described as *Reithrodon Alstoni*.

Dr. A. Günther read a paper containing notes on some rare Reptiles and Batrachians now or lately living in the Society's Gardens.

January 4, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. Sclater exhibited and made remarks on a skin of the Southern Merganser, *Mergus australis*, from the Auckland Islands, belonging to the collection of Baron Anatole von Hügel.

Prof. A. Newton exhibited, on behalf of Prof. Alphonse Milne-Edwards, an egg of *Cariama cristata*, laid last summer in the Jardin des Plantes, and possibly the first ever seen of which the parentage was certainly known, though an egg, also exhibited by Prof. Newton, had been for many years in the collection of Mr. H. F. Walter.

Dr. Albert Günther read an account of the zoological collections made by Dr. R. W. Coppinger, R.N., during the survey of H.M.S. 'Alert' in the Straits of Magellan, and on the coast of Patagonia, and called attention to the most remarkable species represented in the various groups, which had been worked out by himself and his assistants in the Zoological Department of the British Museum. Dr. Günther also called attention to several interesting cases of the similarity of forms in these collections to known forms of the Arctic Regions and of the Australian Seas.

A communication was read from Prof. J. O. Westwood, containing the descriptions of some new exotic species of moths of the genera *Castnea* and *Saturnia*. A second paper by Prof. Westwood contained observations on two Indian butterflies, *Papilio castor* and *P. pollux*.

Prof. W. H. Flower described the skull of a very large Elephant Seal, *Macrorhinus leoninus*, lately received in the Museum of the College of Surgeons from the Falkland Islands, and discussed the question of affinities and systematic position of this animal among the Pinipeds. Prof. Flower arrived at the conclusion, from an examination of its dental, cranial, and limb characters, and from some other points in its anatomy, that the Elephant Seal is the member of the group the farthest removed from the terrestrial *Carnivora*, and showing most Cetacean analogies. He also considered that at present there is no evidence of the existence of more than one species of the genus.

Dr. A. Günther read some notes on the species of Insectivorous Mammals belonging to the genera *Rhynchocyon* and *Petrodromus*, and described two new species of the former genus, proposed to be called *R. macrurus* (from the Rovuma river), and *R. chrysopygus* (from the Mombaça river).

January 18, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, 1880, amongst which special attention was called to a young female Red Wolf, *Canis jubatus*, from the Argentine Republic, presented by Mr. W. Petty, of Monte Video, being the second example of this scarce animal received; and to a Pig from Brooker Island, Louisiade Archipelago, presented by Lieut. De Hoghton, of H.M.S. 'Beagle.'

A paper by Mr. P. L. Sclater and Dr. G. Hartlaub was read, on the birds collected in Socotra by Prof. I. B. Balfour in the early part of the year 1880. The collection contained 124 examples referable to 34 species. Of these seven of the *Passeres* appeared to be new, and were proposed to be called *Cisticola incana*, *Drymacca hæsitata*, *Lanius uncinatus*, *Cinnyris Balfouri*, *Passer insularis*, *Rhynchostruthus socotranus*, and *Amydrus frater*.

Mr. A. G. Butler read a paper on the Lepidoptera collected in Socotra by Prof. I. B. Balfour. The collection contained 24 specimens referable to 13 species, seven of which were stated to be new to science.

Mr. W. A. Forbes read a paper on some points in the anatomy of the Koala, *Phascolarctos cinereus*, as observed in the specimen recently living in the Society's Gardens.

A communication was read from Mr. R. Bowdler Sharpe, in which was given the description of a new form of the family *Timeliidæ*, from Madagascar, proposed to be called *Neomixis*.

A communication was read from Dr. John Scully, containing an account of the Mammals of Gilgit, a district in the extreme north-western part of Kashmir. Thirty-three species were enumerated, and notes on their vertical ranges and habits were added. The Mammals of Gilgit were shown to

consist of an intermixture of Central Asiatic and Himalayan species, as might have been expected from the position of the country. Two species (a Bat and a Vole), apparently new to science, were named respectively *Harpiocephalus tubinaris* and *Arvicola Blanfordi*. — P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

December 1, 1880.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Mr. F. P. Pascoe exhibited a large series of *Areseus histrio*, collected in Peru by Mr. Buckley, and interesting as showing the extreme variability of the markings on the elytra of this species.

The Rev. H. S. Gorham remarked that he had also observed this great variability, and that he possessed one specimen in which the markings were unsymmetrical on the two elytra. He stated that although the markings were so variable, the colour of the antennæ appeared to be always constant.

Mr. C. O. Waterhouse had also seen a specimen marked unsymmetrically, and had likewise observed the constancy in the colour of the antennæ.

Mr. T. R. Billups exhibited four species of *Pezomachus* new to Britain, viz., *P. Mülleri*, *P. juvenilis*, *P. intermedius*, and *P. incertus*. He also exhibited twenty species of Coleoptera found in a small parcel of corn-refuse from Mr. Fitch's granaries at Maldon, viz., *Calandra granaria*, Linn., and *C. oryza*, Linn.; *Trogosita mauritanica*, Linn.; *Leomphlus ferrugineus*, Steph., and *L. pusillus*, Schön. (rare); *Silvanus surinamensis*, Linn.; *Monotoma quadrifoveolata*, Aube (rare); *Bythæa fumata*, Linn.; *Ptinus fur*, Linn.; *Niptus hololeucus*, Fald.; *Gibbium scotias*, Fab.; *Rhizophorthera pusilla*, Fab.; *Alphitophagus 4-pustulatus*, Steph.; *Tribolium ferrugineum*, Fab., and *T. confusum*, Duval; *Latheticus oryza*, C. O. Waterhouse (a new species); *Hypophlaus depressus*, Fab.; *Alphitobius piceus*, Oliv.; *Tenebrio molitor*, Linn., and *T. obscurus*, Fab.

The President exhibited two specimens in alcohol of a species of *Phasmideæ* forwarded by a correspondent in St. Vincent.

Mr. W. B. Cansdale exhibited a specimen of *Tischeria gannacella*, a species of *Tineina*, recently added to the British list, bred from *Prunus spinosa* in May, 1878; he also exhibited a remarkable variety of *Cidaria russata*.

Mr. John Scott communicated a paper "On a Collection of Hemiptera from Japan."

Mr. C. O. Waterhouse read a paper entitled "Description of a new species of the anomalous genus *Polycytenes*," and exhibited a diagram illustrating the structure of this insect."—R. MELDOLA, *Hon. Sec.*

NOTICES OF NEW BOOKS.

Siberia in Europe: a Visit to the Valley of the Petchora in North-East Russia. By HENRY SEEBOHM, F.L.S., F.Z.S. 8vo, pp. 303. With Map, and Illustrations by Charles Whymper and other Artists. London: John Murray. 1880.

UNLIKE many tourists who travel with no particular object in view but to gratify a love of sight-seeing, or visit an out-of-the-way spot only to say they have been there, Mr. Seebohm and his companion, Mr. Harvie Brown, had a very definite purpose in betaking themselves to the inhospitable and uninviting country which lies to the north-east of the White Sea. Their object, briefly, was to discover, if possible, the breeding haunts of certain birds which, though well known to most of us at particular seasons of the year during the period of their migration, have hitherto continued to escape observation during the time they are engaged in rearing their young.

Mr. Seebohm and his friend, after reading all that previous explorers could tell them on the subject, and carefully studying their maps, became convinced that there must be some land between the White Sea and the Kara Sea, some wild uninhabited waste where the birds in question during a brief summer could remain in undisturbed possession of haunts well adapted to their nidification. Impressed with this conviction, they resolved to journey in that direction, and personally test the value of their surmises. Accordingly they so arranged matters as to find themselves early in April at Ust-Zylma, a long straggling village lying on a narrow strip of land on the N. and N.E. bank of the river Petchora, and between seven and eight hundred miles N.E. of Archangel. A more dreary uninviting spot at which to spend the latter end of winter, before the ice had broken up, could scarcely be conceived; but our travellers made the best of it, and occupied themselves, when weather permitted, with excursions in different directions, and with noting and collecting specimens of the few birds which, at this stage of their journey, were observed by them.

Mr. Seebohm thus describes the village:—

“When we reached Ust-Zylma the streets were covered with a thick layer of frozen manure. The yards round the houses were in a still worse

condition, and when the sun was hot it was difficult to walk dryshot in consequence of the pools of liquid manure, which filled every depression in the ground, and no doubt very frequently soaked into the wells. This manure makes Ust-Zylma one vast dunghill, and would probably produce much disease were it not for the fact that it is frozen for nearly seven months out of the twelve, and is in most years carried away soon after it thaws by the floods of the Petchora, which generally overflow its banks, when the snow melts all at once with the sudden arrival of summer. It not unfrequently happens at this season of the year that half the village is under water, and the peasants have to boat from house to house."



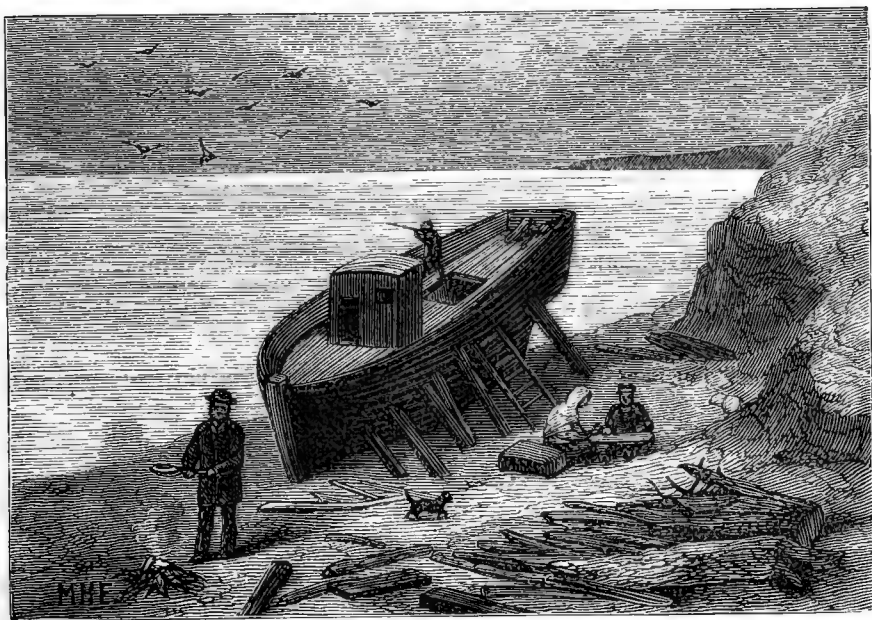
ALEXIEVKA FROM THE TUNDRA.

The flat country on the banks of the Petchora upon which the village is built does not extend more than a few hundred yards. The land then rapidly rises, and these slopes are cultivated for some way up the hill-side. During their sojourn here the travellers were fortunate in obtaining many interesting details respecting the country and its inhabitants from two gentlemen in the employ of the Petchora Timber Trading Company, Capt. Arendt and Capt. Engel, who furnished them also with much information that proved useful to them.

One of the commonest birds observed at Ust-Zylma was the Snow Bunting, which arrives there early in April. The actions of the male birds in the spring were very pretty:—

"They would fling themselves up into the air almost like a shuttlecock, singing all the time a low and melodious warble, not unlike that of a Shore Lark, or perhaps still more like that of the Lapland Bunting, and they would immediately descend in a spiral curve, with wings and tail expanded, and finish their song on a rock."

On the outskirts of the town a few small "parties" of Yellowhammers were met with, and occasionally their familiar song was heard. They were, however, rare; and as none were seen further north it is presumed that Ust-Zylma is about the extreme northern limit of their summer range.



DOING ROBINSON CRUSOE AT DVOINIK.

The forests were remarkably silent. Often there was not a bird to be seen for miles; and on the whole the stay made at Ust-Zylma was by no means encouraging. After eight days' work our travellers had identified only the following species:—Hooded Crow, Raven, Magpie, Tree Sparrow, Snow Bunting, Mealy Redpoll, Yellowhammer, Capercaillie, and Hazel Grouse. The first nest found was that of a Siberian Jay on the 28th April. It contained four eggs.

In the valley of the Petchora both *Linota linaria* (Linn.) and *L. exilipes* (Coues) were found, and from an examination of specimens Mr. Seeböhm came to the conclusion that the latter is nothing but the fully adult winter plumage of the former.

During the comparatively idle time which intervened between the arrival at Ust-Zylma and the journey down the Petchora, Mr. Seebohm collected what information he could about that curious wandering race, the Samoyedes, and his book contains a very interesting account of them. He describes them as a Mongolian race of people of nomad habits. They live almost entirely upon Reindeer. In summer they live in tents made of birch-bark; in winter their tents or "chooms" are made of Reindeer-skins. Their dress also is made of Reindeer-skin neatly sewn together with the sinews of the same animal. The wealth of a Samoyede depends entirely on the number of his Reindeer; each knows his own by marks cut on the animals' ears. In summer the Samoyedes live on the "tundras," some go to the Kanin Peninsula, some to the Timanski Tundra, or Malyazemlia, and others to the northern shores of the Great Tundra, the Bolshaizemlia of the Russians, the Arkya-ya of the Samoyedes.

"These 'tundras' are bare tracts of slightly undulating land, rolling prairies of moor, swamp, and bog, full of lakes and abounding with reindeer-moss, upon which the Reindeer feed. In summer these 'tundras' are quite impassable for horses, but the Reindeer, with their broad feet, will carry a sledge over places where it would be impossible for a man to stand."

This was the ground which Messrs. Seebohm and Harvie Brown were anxious to explore, feeling sure that it would prove to be the nesting-place of some at least of the birds of which they were in search.

Oologists are well aware of the great interest which attaches to the discovery of the eggs of such birds as the Grey Plover, the Knot, the Sanderling, the Curlew Sandpiper, and the Little Stint; and it was to these species above all others that our travellers determined, if possible, to direct their energy and observation. That they were not altogether disappointed we gather from the extremely interesting account which Mr. Seebohm has given of their discovery of the nests and eggs of the Grey Plover (pp. 199—205), the Little Stint (pp. 272—274), and Bewick's Swan (pp. 196, 197). We must not pick all the plums out of Mr. Seebohm's book by giving extracts from these particular pages, but must allow the reader to experience the pleasure of perusing these pages in their entirety by referring him to the book itself.

Although the Sanderling was met with, and specimens procured to place the identification of the species beyond doubt, no nest of this bird was discovered; and, considering how thoroughly the "tundras" visited were explored (in spite of the maddening attacks of thousands of mosquitoes), it seems pretty clear that the Sanderling makes choice of different ground for the purposes of nidification.

By the way, Mr. Seebohm is somewhat in error when he tells us, as he does in a foot-note to p. 229, that it was not until 1876 that properly-authenticated eggs of the Sanderling were procured. He refers, of course, to the eggs found in Grinnell Land by Capt. Feilden, as described and figured in the Appendix to Nares' 'Voyage to the Polar Sea;' but he has entirely overlooked the fact that long before this—namely, in 1871—Professor Newton, in the 'Proceedings of the Zoological Society' for that year (p. 56, see also p. 546), figured the egg of a Sanderling from a nest found by Macfarlane on the Barren grounds of North America, and from which nest the female bird had been shot.

Mr. Seebohm procured a single example of the Curlew Sandpiper (p. 233), but could discover no indication of the breeding of this species on any part of the ground traversed by him. This is one of the birds, and the Knot, *Tringa canutus*, is another, whose nesting haunts still remain undiscovered, and whose eggs still remain to be described.

For the benefit of such of his readers as are not ornithologists, we observe that Mr. Seebohm, in the shape of foot-notes, has given brief descriptions of the true *habitat* and geographical range of each of the birds met with by him in Siberia—a useful addition to his own notes. He is not always quite correct though in his statements, as, for instance, when he tells us (p. 103) that the Whimbrel is found in winter in Australia, where in reality its place is supplied by an allied species, *Numenius uropygialis*, Gould, more properly designated *Numenius luzoniensis*, Gmelin. At p. 122 Mr. Seebohm states that the Ringed Plover, *Ægialitis hiaticula*, "is confined to the western portion of the Palæarctic region;" but he has overlooked the fact of its occurrence in India, in the Goorgaon District, as recorded by Mr. Hume, in 'Stray Feathers' (vol. viii., pp. 197—201), and the further fact of its discovery by Capt. Feilden in the New World—namely, in Buchanan Strait, lat. 78° 48' N.—as reported in the Appendix to

Nares' 'Voyage' (p. 210), and in 'The Ibis' for 1877 (p. 406). Again, the Ruff, *Machetes pugnax*, which Mr. Seebohm tells us (p. 131) is confined to the Eastern Hemisphere, is certainly found in the New World. We learn from Dr. Elliott Coues that it is occasionally killed on the coast of New England and the Middle States, and it has been met with on Long Island (Baird), Massachussets (Brewster, Amer. Nat., vi., p. 306), Ohio (Bull. Nuttall Orn. Club, ii., p. 83), as well as in Spanish Guiana (von Pelzeln, 'Ibis,' 1875, p. 332).

The impression entertained by Mr. Seebohm (p. 127), to the effect that the Blue-throated Warbler, *Cyanecula suecica*, has *only twice* been met with in the British Islands, would have been speedily removed had he consulted the first volume of the fourth edition of Yarrell's 'British Birds,' or pp. 103, 104 of the 'Hand-book of British Birds,' where more than a dozen instances of its capture in England are recorded.

These and a few other similar errors which we have noted are easily rectified, and may well be passed over lightly when we consider the additions to ornithological science which Mr. Seebohm and his fellow-traveller have been the means of making. We should like to quote some of their field-notes on the occurrence in Siberia for the first time, so far as ascertained, of the Eastern Stonechat, *Pratincola maura*, on the habits of the Pine Grosbeak (p. 119), on the distinction between the sexes of the Waxwing (p. 145), and on the habit of perching exhibited by Snipe and other waders, and gulls (p. 147), a habit which the authors believe is due to the flooding of the great tracts of country by the annual overflow of rivers at the time of migration.

But on these and other points equally interesting we must refer our readers to the book itself. Messrs. Seebohm and Harvie-Brown are to be congratulated on the accomplishment of their arduous journey, and upon the valuable results obtained by their exploration of a practically unknown country.

The nice engravings with which the book is illustrated bring vividly before the reader, some of the more remarkable features of Siberian scenery and characteristic forms of Siberian animal life.

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THE PAST AND PRESENT DISTRIBUTION OF SOME OF THE RARER ANIMALS OF SCOTLAND.*

BY J. A. HARVIE-BROWN, F.Z.S.

II. THE MARTEN.

ACCORDING to the statistics at my disposal the Marten appears to be of rarer occurrence now than the Wild Cat, being extinct in many localities still frequented by the latter species, but curiously enough it seems to have survived over a wider area up to a later date. In other words, whilst the Wild Cat has retreated, and is only found now beyond the lines traced in my account of that species (p. 11), and was forced beyond them not later than 1875 (when one was got in Glen Tanar, Aberdeenshire), the Marten is still found at localities south and east of this line, or has been found at later dates. Thus, it is still not uncommon in Rothiemurchus, and it is not yet extinct in the Valley of the Tay, whilst one was killed as lately as 1879 in Glenartney (Perthshire), and in 1874 at Culzean, in Ayrshire—localities amongst others which have long been deserted by the Wild Cat. This will become more evident when the particulars of its retrogression are pointed out. It is not, however, always easy to decide whether the Marten can be considered as extinct in any given locality, because it is often found after long intervals frequenting localities which were famous for their numbers

* Continued from p. 23.

in former times. Severe winters may, and doubtless do, have some influence in causing them to wander farther and extend the area of their hunting-grounds, and thus they appear most unexpectedly, and after long previous absence. It is, I think, undoubtedly the case that they do wander over a large area, and they appear to be much greater wanderers than the Wild Cat.

The cause of the sudden decrease of the Marten in many localities is principally owing to their unsuspectingness of a baited trap. Several correspondents distinctly affirm that "the baited trap has exterminated them." Besides this, rabbits, which have largely increased in many Highland districts, are now more systematically trapped, and the Marten being fond of rabbit, more frequently "puts his foot in it." A very large proportion of the records of Martens killed in later years show that they were obtained either accidentally in rabbit-traps, or in baited traps set on purpose for them. Had it not been for the sanctuaries afforded by the deer-forests, it is probable that they would have become extinct in the Highlands before now.

Martens linger longest where there is abundance of native pine woods, as is clearly shown in the following returns to any one who is acquainted with the topography of Scotland. Their power of concealing themselves must be very considerable if we look at the curious sporadical occurrences of the species at localities apparently long previously untenanted; but the true cause of these isolated occurrences, there is every evidence to prove, is the wandering habit of the species. They could scarcely for so long escape the rabbit-traps set in numbers in the Lowlands; and it is only amongst the rough boulder-strewed hillsides and old pine woods, or amongst the rank growth of heather, where comparatively few rabbits exist and are not systematically trapped, that Martens can long exist in security. Rabbit-trapping in the Lowlands, and game-preserving and baited traps in the Highlands, I believe to be the two principal factors in the exterminating process as regards the Marten. We cannot, owing to this wandering habit, so easily trace a boundary line between the districts inhabited and those uninhabited by the species, but a sufficiently accurate idea can be formed if the following notes be studied, map in hand.

South of Scotland.—The Marten is so extremely rare in all parts of Scotland south of the Firths of Forth and Clyde that I

have failed in obtaining any tangible statistics of the dates of its extinction, except the few I give below, all others being negative, and little apparently being known about it by people in these districts. In Ayrshire Mr. J. Cairns, Kilkerran, and Mr. James Cox, gamekeeper, Culzean, both inform me of one killed, caught in a rabbit-trap on Culzean in the winter of 1874. In Kirkcudbright it is said to have been a dweller in the parishes of Colvend and Southwick at the date of the 'Old Statistical Account' (*op. cit.*, vol. xvii., 1796, p. 109). In some parts of the Cheviots it is believed still to exist in small numbers (*Proc. Berw. N. Club*, vol. vii., p. 505, and vol. viii., p. 527), and we have late evidence of its presence in Cumberland,* and elsewhere in England and Wales† not uncommonly.

Stirlingshire.—They have long been extinct, even in the wider parts, such as the shores of Loch Lomond, and even as long ago as the date of the 'Old Statistical Account of Scotland' it was spoken of as rare in several districts, but to have "lately appeared" in others, such as Campsie, amongst the rocks of the Campsie Fells ('Old Statistical Account,' vol. xv., 1794, p. 323). Thus, even in those days the appearance of the species at many places appears to have been irregular, owing no doubt to its predatory and wandering habits.

Dumbartonshire.—It is now believed to be extinct, as none have been killed since 1832, when one male and one female were trapped at the same bait on the same evening at Rossdhu. These are now in the collection at Rossdhu, as I am informed by Mr. Colquhoun, who tells me they were abundant at Rossdhu within his recollection, and were often trapped at the poultry-yard. Since the above was written, however, Mr. James Lumsden informs me that one was killed at Poachy Glen, near Renton, about fourteen or fifteen years ago (say 1865 or 1866).

Fife and Kinross, and South of the Ochil Hills.—Mr. Charles Cook, of Edinburgh, sends the following particulars of a specimen in his collection:—"My specimen, which is a full-grown male, was caught on May 19th, 1870, in an ordinary rabbit-stamp

* Durnford, 'Zoologist,' 1878, p. 128. Parker, auct. Hope, 'Naturalist,' Edin.

† I possess the skin of one killed in Wales, which belonged to the late Dr. Saxby.

set for rabbits in the extensive woods on the slopes of the East Lomond Hill, in Fifeshire, on the Falkland Estate, by one of the gamekeepers. It was sent to me by Mr. James Lugton, the then headkeeper there. He had not seen or heard of any animal like it before in that neighbourhood, and he had been keeper there for many years." Mr. Cook is of opinion that it was a wanderer from the Perthshire highlands in search of a mate. "However, the woods where he was caught are very extensive, and it is just possible he may have been the last of his race." Since this male was obtained, however, another was killed in 1873 at Broomhall, near Dunfermline, the seat of Lord Elgin, by Mr. Stark, gamekeeper. This specimen was also a male.

Perthshire.—None have been met with during the past thirty years, or since 1850, in the valley of the Allan between Perth and Stirling. It is not remembered as existing in the neighbourhood of Leny, Callander, but is quoted in the 'Old Statistical Account' (vol. xi., 1794, p. 598). Of late years, however, Martens have reappeared in that district and in the neighbouring forest of Glenartney, and other parts of S.W. Perthshire. Mr. Arthur S. Stark writes me that he "saw a Pine Marten in the wood behind Callander in the beginning of June, 1879." He adds:—"I was standing with my back against a tree watching some Cole Tits, when I noticed it hunting about, and, as it ran backwards and forwards not more than half a gunshot from me, I could make it out very distinctly with my binoculars. The chest-patch was very distinct." In Glenartney also one was killed so lately as February, 1879, on Drummond Castle Estate; and Mr. John Colquhoun heard that two were seen in the scrub-wood skirting the base of Ben Vorlich three years ago (say 1877). The last killed to the south of Glendochart was in 1871, on Suie property, by Mr. Macpherson, gamekeeper. It was considered by the people—natives of Glenartney—to have been extinct for thirty-five years at least, when the above one in 1879 was obtained. Mr. Duncan M'Gregor, who has been twenty-two years gamekeeper in the Glen of the Ruchil, in Glenartney, writes me concerning the above specimen:—"In March, 1879, however, one of Lord Aveland's men, going along the river (Ruchil), near the waterfall below Dalclathic Bridge, got one in his traps. It was bought by D. Rose, game-dealer in Crieff, for stuffing. No person can say how it came to this glen. My opinion is that, owing to the

severity of the weather, it was forced to leave its northern hills, and followed the winding of one of the tributaries of the Tay to the lowlands, and when caught was probably trying to go back, but took the wrong stream." We must, however, in this connection, consider the two seen at the base of Ben Vorlich about 1877, as related above by Mr. Colquhoun. It has been extinct for twenty-five years, or since 1855, around Dupplin. One was killed on Lyndoch Estate by Mr. Grass, keeper of the late Lord Lyndoch, about 1845, or a little earlier. The tree on which it was shot is still called "the Wild Cat Tree," a large spruce on the road between Monedie and Pitcairney. Some were killed about twenty-five years ago on Balquhidder (say 1855), but it is supposed to be extinct now. In the Callander district "the baited traps have exterminated them." It has never been seen or heard of in the neighbourhood of Cromlix by the keeper, who has been there more than twenty years. At the date of the 'Old Statistical Account of Scotland' they were included as frequenting the parish of Comrie, and also Weem. Curiously enough, since the above was penned, news reached me of another killed on Stronvar, in Balquhidder, which will be found recorded in the 'Field' of 17th April, 1880. It was obtained by one of the keepers early in that month. Thus both of the two seen on Ben Vorlich, as reported by Mr. Colquhoun *ut. sup.*, are probably accounted for. Have they left any young ones behind them, or are these the *last*, until some unusually severe winter drives others to wander south again? Between Glen Almond and Glen Queich, about thirty years ago, some were killed, for Mr. J. Anderson remembers seeing them hanging up amongst vermin in the "gamekeeper's museum." This would be about 1850. In 1867 Mr. Dewar, keeper at Remony, killed a fine male, yellow-breasted, which is now in his collection at Finlarig, near Killin. None had been seen, according to Mr. Dewar, previously, since 1840, when one was killed by him at Remony, south side of Loch Tay; but Mr. Mackie, formerly keeper on Breadalbane, killed one about two miles from Loch Tay, at the falls of ———? about eighteen years ago (say 1862). It was at that time rare in the district, and people came a long way to see it. Mackie had noticed the tracks of some animal about the rocks, but could not make out what it was; he therefore set some traps, without bait, and got the Marten-cat. This is the last Mackie has heard of in that district.

On Mornish, Loch Tay side, adjoining Remony, one Marten is included in the list of vermin killed in 1868. I have to thank Mr. D. Dewar for this list of vermin, which presents many interesting facts in connection with the past and present numbers of some of our indigenous animals. In another list of vermin killed on Remony and Claggan Hill, between 1849 and 1855, no Martens are included, nor Polecats nor Wild Cats. As has already been seen, however, the Marten is not quite extinct in Perthshire. Dr. MacIntosh, of Murthly, writes me:—"One is occasionally seen making its way from the steep and wooded slope above the river to the asylum grounds. It was first observed last year" (1879). I had fully chronicled the reported occurrence of a Marten at Rednock, in S.W. Perthshire, as given in the papers, and reiterated by the person himself who caught the animal, now more generally known locally as "the Rednock beast"; but certain descriptions which reached me causing me grave doubts, I applied for corroborative evidence to various friends living in the district. After actually seeing it, all agreed that "the Rednock beast" was a common "coon," and none could imagine how it came to be designated a Marten. Whence this racoon came, no one appears able to say, but from the fine condition and sleekness of the beast it must have been at large some time.

Forfarshire.—During the last twenty-five years only two have been killed in the county, and these two about the year 1860, the one on Stracathro Estate, the other on Dun estate, male and female. The distance between the two estates is four miles. My informant, Mr. J. B. Smart, adds:—"It was thought that it was the severity of the weather that had driven the Marten-cats so far south, as none had been heard of for a long time previously anywhere in the county. They are believed to be extinct now in the county."

Argyleshire.—In this county Martens are becoming scarce. They were stated in 1792 to be extinct in Sunart, and "not so frequent as formerly" in Kilmorich and Loch Gailhead.* On Loch Awe-side the last killed were male and female, between Taigh-achregain (Taycreggan) and Taynuilt, in 1871. They are still to be met with, however, in Glen Etive, Glencoe, and the Black

* 'Old Statistical Account,' vol. iii., p. 176.

Mount Forest, in which latter they are preserved. At the date of the 'Old Statistical Account' they were still found in Ardochattan and Muckairn. In Ardnamurchan a few were killed between 1856 and 1860, as I am informed by the proprietor, but none have been seen there since 1862, when the present gamekeeper first came there.

Aberdeenshire.—They are becoming decidedly scarce. Sixteen years ago (say 1864) Mr. Mackie, whose name is already mentioned under Perthshire, killed a pair at Littlewood, near Alford, with unbaited traps. Six Martens have been killed during the last ten years (1870—80) in Glen Tanar, as I am informed by Mr. Milne, forester. They linger here owing to the shelter afforded by the old pine woods, and from this sanctuary the two killed in Forfarshire in 1860 probably wandered. From the district of Buchan inquiries have elicited no positive evidence. They linger still in the S.W. of the county, as shown above, but the last heard of by Mr. George Sim, which was killed to the north of the city, was one killed in the woods of Ellon on the 1st June, 1874. Scarcely a season passes, however, without one or two coming from the neighbourhood of Lochnagar. On the 10th April, 1880, Mr. Sim had one from there, which had been killed only shortly before. "The flesh," Mr. Sim adds, "was quite fresh." They are still pretty numerous in parts of Braemar. Two were killed in Glen Derry two winters ago (1878—79).

Moray, Banff, Elgin, and Nairn.—Capt. Dunbar Brander, of Pitgaveny, informs me that a pair appeared in a wood near Burgh head, on the coast. They were caught and stuffed, and were for years in a gunmaker's shop in Elgin. This was about twelve or fourteen years ago (say 1866 to 1868). "Not the oldest poacher or keeper has ever seen one here—at Pitgaveny. It was a mystery how they came, or from where."

Invernesshire.—The Marten is still not uncommon in this county. It is reported as still common in Glenmore, Rothiemurchus, and Glenfeshie. James Grant, gamekeeper, left Glenmore three years ago, and killed many during his time there, dating from say 1877. It is still found in Badenoch, but is believed to be extinct in Ben Alder deer-forest, none having been seen for several years back. At Invereshie, during the past two years, four have been trapped by Mr. Sutherland (1879—80). For the same reasons given under Wild Cat, I do not mention here

all the localities where I know it is still found, the object of these records being more to show the minutiae of its past than of its present distribution, a general idea of the latter being sufficient for all practical purposes of the paper. North of the Caledonian Canal it is still common. In the deer-forests it is in a measure preserved, and not indiscriminately trapped. It is, however, becoming scarce in the neighbourhood of Fort Augustus. Had it not been for the deer-forests they would ere this have been extinct in the North of Scotland. One was killed at the last-named locality in 1877, or "about three years ago," and another thirteen or fourteen years ago (say 1866) by the keeper on Lord Lovat's ground. It is considered rare at Beauly now, and generally in the east of the county. Only five have been taken on Struy since 1874. At Guisachan they were formerly common; five or six were trapped there annually up to 1870; since then they have become of rare occurrence. Alexander M'Gillivray trapped one at Plodda, one mile and a half from Guisachan House, in December, 1875. The last one obtained was trapped by Rory M'Gillivray in January, 1878, at Knockfin, two miles distant. These two specimens are white-breasted and yellow-breasted, and have been preserved, and are now in the gun-room at Guisachan. I am obliged to Sir Dudley Marjoribanks, Bart., for kindly putting the above notes at my disposal. Since the above was penned, I have been informed that two were taken in April, 1880.

Rosshire.—To Mr. Osgood H. Mackenzie, of Kinloch Ewe, I am much indebted for interesting notes on the Marten in Rosshire, of which the following is an extract. The last Marten killed in Mr. Mackenzie's district was on his own property twenty-five years ago (say 1855). He writes as follows:—"They had a most curious home on my ground, which is still called 'Clach more nan Taghan' ('the big stone of the Marten,') or, as my English friends call it, 'Castle Marten.' It is a carried boulder about ten feet high. The Martens had been killing sheep, and a fox-hunter having been sent for, day after day the track of the Marten was lost by the hounds always near this boulder. At last it was found that the Martens jumped from the ground on to a ledge in the side of the boulder, and had their young ones in a mass of peat on the top, which was perforated with their holes. They were dug out of this and killed. About eighteen or

twenty years ago (say 1860—62) a number of Martens were killed at Dundonnell, and the late Miss Mackenzie, of Dundonnell, gave me a number of skins. When my mother, Dowager Lady Mackenzie, of Gairloch, was managing that estate for my brother, Sir Kenneth Mackenzie, who was then a minor, she used to get about thirty or forty Martens' skins every year, chiefly from the natural pine-woods of Kinloch Ewe. At Bein Damph, Torridon, Mr. Duncan Darrochs, keeper, killed two Martens two years ago." They have long been plentiful about Torridon, as the fir plantations are specially attractive. Mr. J. Colquhoun tells me that in 1863 six were trapped at Torridon in the winter time. They were described to Mr. E. R. Alston in August, 1880, as "almost, if not quite, extinct" now in the Loch Maree district. In Fannich Forest it is believed to be extinct. The present forester, a most observant naturalist, has never seen one there. It is believed to be extinct also in the East of Rosshire. In Strath Conan the Marten was very abundant at one time, but none have been seen there for twenty years (say 1860). The last killed was about that time. It had a white breast.

Harris and Lewis.—About twenty years ago they were abundant (say 1860). About five years ago (1875), when Mr. O. H. Mackenzie was stalking deer in Sir James Matheson's Forest of Mhorskail, in The Lews, he met with a dead Marten, which had lost its life in a somewhat singular manner. I quote here Mr. Mackenzie's own words:—"I suddenly came to a place where there was a lot of wool scattered about, and there was every appearance of there having been a struggle between a sheep and some other animal. I knew there were a few stray sheep in the forest, but knowing there were no foxes in the island, we thought this sheep must have been attacked by an Eagle. I continued my stalk. About one hundred yards from where we found the wool I came upon a large Cheviot wedder lying dead, with its head down hill, and its shoulder jammed up against a stone which was sticking out of a bank. In passing I gave the fore-quarters of the sheep (which appeared to have been dead about a fortnight) a kick, and under its shoulder and neck lay a dead Marten. The wedder, in rushing madly down hill with the Marten at its throat, had dashed itself against the sharp stone, which killed the Marten. The sheep's throat being cut, it had not had strength to get upon its legs, but bled to death where it

lay." On Park Lodge Shootings, as I am informed by Mr. Notman, the last seen was in 1869; in 1868, one; in 1867, one; 1866, three; 1865, three. Thus in five years, between 1865—69 inclusive, nine Martens were seen or killed.

Sutherlandshire.—In East Sutherland Martens are very scarce. Only two have been caught on Dunrobin during more than twenty years. One was got in Balblair Wood in 1860, and another in 1868 at Dunrobin. In other parts of the county it is not, however, so scarce. I have myself seen twelve Martens' skins in the possession of one keeper in Assynt in 1869, and I have heard of an equal number being killed in one season in the north of the county in 1877. That they are scarcer now than formerly, however, cannot be gainsaid. Mr. T. Mackenzie, anxious to procure a skin, employed about a dozen keepers in Sutherland. He did succeed in getting one, but only one, and he concludes that it is nearly "played out" in the county. Two fresh-slain Martens, however, were seen in M'Leay's shop on the 9th April, 1880, by Sir J. P. Campbell Orde, Bart., which were got in Sutherland, and since the above was written Mr. Mackenzie procured another very large old male. I hear also of one having been killed in the winter of 1879-80 in Assynt. Before that, I find that twenty-two were killed by one keeper between 1869—80, the largest number in one year being eight (in 1869), and the next largest being five (in 1870), whilst another keeper killed fifteen in 1870—1873 inclusive, and no more again until 1879-80.

No statistics illustrate better than these the rapid extermination of the species by the direct agency of man, and it is interesting, though melancholy, to note how the misfortunes of the dying races of the Marten and Wild Cat in these districts run parallel with one another.

Since writing the above I have learned that the Marten is probably nearly extinct in the Long Island. Mr. Mackenzie reports:—"A shepherd in Park district of the Lews says that about eight years ago he saw two Martens get out of a cairn from the keeper's dogs and make their escape; and that he has never heard of any being seen there since. There may possibly be some alive yet, but if so, they are confined to that part of the island. The late Sir James Matheson's piper, Mr. McKay, who came to the Lews many years ago, trapped many Martens, but no Polecats."

ERRATA.—Page 13, for "Souwick Glebe" read "Senwick Glebe," and for "Balmaangan" read "Balmangan."

ON ASIATIC BLOWPIPE FISHES.

BY FRANCIS DAY, F.L.S., F.Z.S.

ON November 6th, 1879, I read a paper before the Linnean Society upon "Instincts and Emotions in Fish," which was printed in the Journal of that Society, Zoological series, vol. xv. In that article, at page 54, I observed that *Chelmon rostratus*, according to the account given by Hommel, ejects a single drop of water from its tubular mouth with which it is able to strike flies off plants into the water. The author of 'An Introduction to the Study of Fishes' has since remarked, with reference to this instinct of *Chelmon*, "This statement is erroneous, and probably rests upon the mistaken notion that the long bill is especially adapted for this manœuvre, which, indeed, is practised by another fish of this family (*Toxotes*)";* while in a popular account of fishes still more recently published by Mr. Seeley, there is an illustration in which the *Toxotes* is represented as thus employed, but with the head entirely raised above the surface.†

I propose adducing reasons for the belief, first, that the fish alluded to by Hommel was *Chelmon rostratus*; and, secondly, that it is physically impossible for it to have been a *Toxotes*.

The first published notice on the subject is contained in the 'Philosophical Transactions of the Royal Society of London' for 1764, vol. liv., p. 89, t. ix.,—"An account of a fish from Batavia, called *Jaculator*,"—respecting which Mr. Hommel, the Dutch Governor of the Hospital at Batavia, gave a very interesting account from hearsay:—"It frequents the shores and sides of the sea and rivers in search of food. When it spies a fly sitting on the plants that grow in shallow water, it swims on to a distance of four, five, or six feet, and then with a surprising dexterity it ejects out of its tubular mouth a single drop of water which never fails striking the fly into the sea, where it soon becomes its prey." Subsequently he "had some of these fishes caught and put into a tub of sea-water, which was changed every other day." When reconciled to their new abode, he had flies pinned on to a slender stick, and "it was with inexpressible delight that he daily saw

* Günther, 'Introduction to the Study of Fishes,' p. 399.

† Cassell, 'Natural History'—Fishes, plate li.

these fish exercising their skill in shooting at the fly with an amazing velocity, and never missed the mark."

Then follows a description of *Chætodon rostratus* of Linnæus (Mus. Ad. Frid., 1754, p. 61, t. 33), as being the species alluded to, the tubular-mouthed fish that knocked down insects at a distance of several feet by discharging at them a single drop of water. To obviate any misconception, a figure is given at plate ix., which is the fish alluded to, identical with Linnæus's *C. rostratus*. (See fig. 1 opposite).

In volume fifty-six of the same 'Transactions,' p. 186, occurs "Some further intelligence relating to the Jaculator-fish, mentioned in the 'Philosophical Transactions' for 1764, Article xiv., from Mr. Hommel at Batavia, together with the description of another species by Dr. Pallas, F.R.S., in a letter to Mr. Peter Collinson, F.R.S., from John Albert Schlosser, M.D., F.R.S."

Here the account of the Jaculator is continued, and Mr. Hommel remarks:—"With the closest attention I never could see any part of the mouth out of the water, though I have very often seen the Jaculator fish shoot a great many drops one after another, without leaving its place and fixed situation. No more than two different species of this fish are found here. The first and rarest kind is that which I sent before; and to the description published in the fifty-fourth volume of the 'Philosophical Transactions' the foregoing account may be added. You will now receive from me a specimen of the second species, which is the most common here."

A figure of this second species, termed *Sciæna jaculatrix*, is added (see fig. 2 opposite), leaving no doubt as to its being the fish now known as *Toxotes jaculator*, but to which the foregoing account does not refer, as expressly observed. While Pallas, in his 'Spicilegia' (1770, fasciculus 8, p. 41), when alluding to this second form, or *Sciæna jaculatrix*, which he terms "*Sciænis vel Sparus*," very properly omits all suggestion as to its being endowed with shooting propensities, because such were not attributed to it by Hommel or Schlosser.

Pallas in his 'Spicilegia,' l. c., figures a third form (see fig. 3 opposite), which he terms *Sparus insidiator*, and also attributes to it the same habit of shooting insects as was assigned to Hommel's first fish. He adds a figure which most unquestionably refers to an *Epibulus*, as observed by Cuvier and Valenciennes (vol.

xiv., p. 111). Thus up to 1770 only two species of fishes were recorded as shooting flies; the first by Hommel, from personal observation, of which a specimen sent to Europe was figured in the 'Philosophical Transactions,' and identified as *Chætodon rostratus* of Linnæus; the second, whose habits were only vouched for by general repute, was an *Epibulus*, and has been figured by Pallas. No one, that I can ascertain, had asserted that the *Sciæna jaculatrix*, now known as *Toxotes jaculator*, with its deeply cleft mouth, was able to use it as a blowpipe.

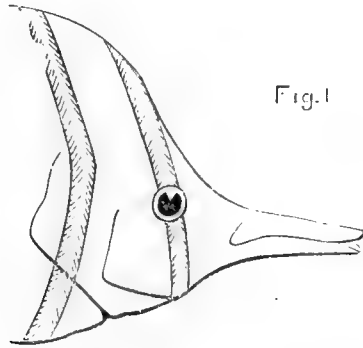


Fig. 2

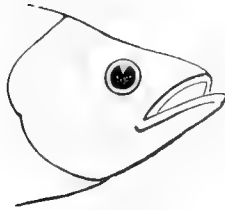


Fig. 3

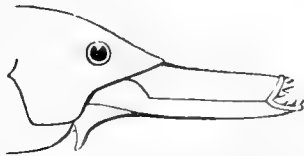


Fig. 1. *Chætodon rostratus*. Phil. Trans. 1764, p. 89, t. ix.

Fig. 2. *Sciæna jaculatrix* = *Toxotes jaculator*. Phil. Trans. 1766, p. 86.

Fig. 3. *Sparus insidiator*. Pallas, 'Spicilegia,' 1770, p. 41.

Even if we possessed no figure of Hommel's *jaculator*, it would be a physical impossibility that *Toxotes* was referred to by him. In fishes of this genus the mouth is deeply cleft, its angle being below the middle of the eye; its lips are thin, and closely investing the jaws; its tongue is covered with teeth, free at its edges, and terminating anteriorly in an obtuse point. It

has no means of shaping its mouth into a tubular form, and it must be conceded that, with such a head *kept entirely under water*, it would be impossible to propel a drop of water *through the water*, to reach the surface, as described in the case of *jaculator*. This is so self-evident, that the artist in Cassell's plate has elevated the whole of the fish's head out of the water; having accomplished which, it no longer accords with Governor Hommel's description of facts wherein he observes, "I never could see any part of the mouth out of the water."

This brings us face to face with the following question: Is Governor Hommel's account inaccurate? It certainly does not refer to *Toxotes*. I accepted it as pertaining to *Chelmon*, which is figured, while the statement is now said to be *erroneous*.

In the 'Edinburgh New Philosophical Journal,' 1828, is a paper by Mr. James Mitchell, "On the *Jaculator* fish of Java, or *Chætodon rostratus*, Linn." He gives a very interesting account of what he observed in December, 1822, at the house of a Javanese chief who lived within a mile of the town of Batavia:—

"The fish was placed in a small circular pond, from the centre of which projected a pole of two feet in height. At the top of this pole were inserted small pieces of wood, sharp-pointed, and on each of these were placed insects of the beetle tribe. The placing of this pole and insects by the slaves had disturbed the tranquillity of the fish, so we had to wait some considerable time before they began their operations. But this delay was amply recompensed by the amusement they afterwards afforded us. When all had been tranquil for a long time, they came out of their holes and swam round and round the pond. One of them came to the surface of the water, rested there, and after steadily fixing its eyes for some time on an insect it discharged from its mouth a small quantity of watery fluid, with such force and precision of aim as to force it off the twig into the water, and in an instant swallowed it. * * * I was informed that these fishes were originally imported from China, and are now the only specimens alive in Java, although about fifty years ago they were in the possession of several of the Javanese chiefs."

He adds that, from the view he had of them, which was only in the water, they appeared about five or six inches in length, rather short in the body, with blackish stripes variously interspersed. This second observer thus confirms Governor Hommel's statement, while he likewise considered the fish to be *Chætodon rostratus* of Linnæus.

I will now pass on to consider when this power of shooting

insects with a drop of water was first attributed to the *Sciæna jaculatrix*, now known as *Toxotes jaculator*. In 1788, Gmelin, in his edition of "Linnæus," p. 1244, gave *Chætodon rostratus*, Linn., as identical with the *Jaculator* fish, referring to the paper of Schlosser, 1764, vol. liv., p. 9, t. 89, observing:—"Victitans insectis supra aquam volitantibus, in quæ rostro tubuloso exquisitissime explodit guttulam." At page 1282 he gives *Scarus Schlosseri*, which he considered as identical with Pallas's fish ('*Spicilegia*,' viii., p. 41), which is *Sciæna jaculatrix* of Schlosser (Trans. Roy. Soc.), and he does not suggest that this fish shoots insects. At p. 1273 he inserts *Sparus insidiator* of Pallas, which is an *Epibulus*, adding, "Oris in longissimum tubum emissilis ope, Chætodontis rostrato more insecta aquatica prædans."

Bonnaterre, '*Encyclopedique et Méthodique*,' 1788, followed Gmelin, and in 1802 Lacépède did the same, but gave, in vol. iii., pp. 425, 463, a *Labrus jaculatrix*, and in vol. iv., pp. 5, 17, a *Scarus Schlosseri*, these two forms being evolved from the *Sciæna jaculatrix*, Schlosser, the "*Sciænis vel Sparis*" *jaculatrix* of Pallas.

The next author was Shaw, who, in vol. iv. of his '*General Zoology*,' 1803, describes *Scarus Schlosseri* as identical with Gmelin's species, p. 1282, or Pallas's form, in note, p. 41, which is the same as that in the '*Philosophical Transactions*,' vol. lvi., and wherein no notice is taken of its shooting insects; while this fish with a figure taken from the '*Transactions*' likewise appears at p. 485 as *Labrus jaculator*, and is said to be a "native of the Indian seas, preying on insects in the same manner as *Chætodon jaculator*."

Omitting other authors, we may well pass on to Cuvier and Valenciennes's grand '*Histoire Naturelle des Poissons*,' in which, at vol. vii., p. 310, this question is considered, but without the production of any new evidence on the subject; and it is decided that *Sciæna jaculatrix* is to be known as *Toxotes jaculator*, Cuv. & Val., also that it discharges drops of water at insects. In the same work it is also accepted that Governor Hommel's account referred to *Chætodon rostratus*, Linnæus, or *Chelmon rostratus*, Cuv. & Val., while he merely referred to one species of fish.

Now another change is proposed. Hommel is supposed to be wrong; the fish figured with a tubular mouth is assumed to have none such, and not to keep it below the surface; and the species therefore must have been erroneously recognised when

sent to Amsterdam ! I am of course unaware upon what grounds Dr. Günther's opinion has been formed, but cannot help thinking that he, not Hommel, is in error.

A few years since, the late Dr. Bleeker, just prior to commencing the ninth volume of his magnificent 'Atlas Ichthyologique,' spoke to me respecting the assertion that *Toxotes* shoots insects with a drop of water propelled from its mouth. "An interesting exercise of ingenuity," observed that celebrated ichthyologist, "for which the form of its mouth seems totally unadapted, a plan I have never seen it adopt when resident in the East; was unable to hear anything about in Batavia, where I made enquiries; nor could I meet with anyone there who had personally witnessed it or had any confidence in its occurrence." In his paper on "*Toxotes*," published in Amsterdam in 1875, he observed, respecting this faculty attributed to fishes of the genus, "Je crois aussi que la célébrité n'est pas méritée, et ne repose que sur une erreur."

Personally I paid special attention to this question when investigating the fishes of Burma, but no fisherman had ever heard of this ingenuity being attributed to *Toxotes*, and which I cannot help thinking, with the late Dr. Bleeker, must be an error. That such a faculty in a fish exists can hardly be disputed, but how a tubular-mouthed species which remains some moments immovable before shooting a drop of water at an insect—during which time its entire head is under water—has become transformed into a form possessing a deeply-cleft mouth, which raises its head out of its native element to take a flying shot at an insect, I leave for explanation to Dr. Günther and Mr. Seeley. Until some evidence in support of their views is adduced, I prefer accepting the statements of Hommel and Mitchell, as well as the published figures and identification of the species by Schlosser and Pallas, to whom the example was transmitted from Batavia. Even if it can be proved that *Toxotes* ever shoots insects with water, this would not disprove the positive statements of Hommel and Pallas, the former having witnessed the occurrence he described, and the latter having correctly determined the species to be what is now known as *Chelmon rostratus*, Cuv. & Val.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

INTRODUCTION.

IN the course of a series of papers, it is our intention to record what we should prefer to term "Notes and Observations on British Stalk-eyed Crustacea," in which we propose to give a short description of various species, together with local variations, local names, methods of capture, and particulars as to habits, &c., that from time to time have come under our notice. If any apology were needed for such a course, we think it may be found in the extremely scanty knowledge of the Crustacea that exists even among many naturalists. At present our scientific publications contain little or nothing in the shape of contributions on the subject, and the works of authority thereon may be counted on the fingers of one hand. The result of this naturally is that the knowledge of our British Crustacea is confined to very few, and the difficulties, more imaginary than real, which attend their study, deter many from giving attention to this most interesting and instructive branch of zoology. It is with the idea of drawing attention to this subject, and of removing some of the difficulties referred to, that we propose to write this series of papers, and we shall feel fully rewarded for any trouble taken in the matter if we succeed in making the study of Crustacea more popular.

If any proof were needed of the paucity of information on the subject of Crustacea amongst the public generally, we may mention that one of the leading London daily papers recently referred to crabs and lobsters as *molluscs*. This reminds us of a student who, when asked by his examiner what a crab was, replied that it was a red fish which walked backwards. The professor remarked that with the trifling exceptions that it was not red, nor was it a fish, and that it did not walk backwards, he was quite right.

Probably the first thing which the intending student of this group will discover, is, that no recent manual of the Stalk-eyed Crustacea is to be obtained. This is, of course, a serious drawback for one commencing the study. Nevertheless, one need not be disheartened, for with a little trouble we can find almost all we

require. In English, the best book is the late Professor Bell's 'History of the British Stalk-eyed Crustacea,' published so long ago as 1853. At the date of its publication it was no doubt all that could be desired, but since 1853 several species have been added to the British fauna, and many which he considered rare are no longer so. This work will be found indispensable, for with the plain descriptions are beautifully-executed woodcuts of every species then recognised as British. Following in his wake the late Adam White compiled a useful little book entitled 'A Popular History of British Crustacea.' This brought the subject down to 1857, with several additions to our fauna. White gives short descriptions and a few additional localities other than those mentioned by Bell. Mr. P. H. Gosse, in 1855, published his 'Manual of Marine Zoology,' in which, of course, he alludes to the Crustacea, but gives only generic descriptions. For the species added to our fauna since 1857 we have to search through scattered papers in various scientific journals, published not only in London, but also in the provinces. It is hoped that there may be issued shortly a synonymic list (which will be useful also for cabinet labels), bringing the subject up to the present time.

For the classical work on the Crustacea we have to go to our neighbours, the French; the '*Histoire Naturelle des Crustacés*' of M. Milne Edwards, published in Paris in 1834, being the work of all others on the group. It treats of all species known to the author at the date of publication, and refers not only to the Stalk-eyed, but also to the Sessile-eyed, Crustacea. The scientific descriptions are in French, but are easily read. The arrangement used by M. Milne Edwards is the one generally followed at the present time.

Amongst the earlier English writers on the subject, perhaps the most important was Dr. William Elford Leach, who, in 1815—17, published his '*Malacostraca Podophthalma Britannicæ*, or Descriptions of the British Species of Crabs and Lobsters.' This fine work contains quarto plates, with coloured figures of many species. We need hardly remind our readers that Dr. Leach was Curator of the British Museum up to 1821, but died in Italy when scarcely past middle age, quite broken in health and intellect. Pennant, in his '*British Zoology*' in 1777, gives some plates of British Crustacea. Montagu, in 1804, described those species known to him as occurring on the Devonshire coast.

Continental writers on the subject include Linnæus, in the twelve editions of his 'Systema Naturæ,' from 1735 to 1766; Fabricius, in his several works on Insecta (1775 to 1787) refers to this group; Herbst, from 1790 to 1804, published his fine work, 'Versuch einer naturgeschichte der Krabben und Krebse,' profusely illustrated with sixty-two coloured plates; Lamarck (1801); Latreille (1805); Risso (1815); Roux, 'Crustacea de la Méditerranée' (1828); and others of more or less importance.

For a work on the anatomy of these animals, all students should carefully read Professor Huxley's recently published manual on "The Crayfish."* This treatise once mastered, little trouble will be experienced with the anatomy of other members of the *Podophthalma*.

The next subject to be referred to is the distribution of the British Crustacea, and this is so general that the difficulty would be to find a part of our coasts where some species or other does not occur, though some localities are more favoured than others, and the connection between some species and the geological character of the coast line is of sufficient interest and importance to be particularly noticed when we come to treat of the species referred to. Rock pools, sandy, and even muddy shores, as well as deep water, all yield their various species, and a few words as to methods of capture may be acceptable. It is here that some difficulties present themselves, for it is not always convenient or possible to go on dredging or fishing expeditions oneself, and, as the numerous dredgers and trawlers of our coasts are undoubtedly the best sources from whence to obtain specimens, it is very desirable to be able to explain the species or genera that are required. This is extremely difficult, owing to the local names which almost everywhere exist, and by which alone the specimens are there known. It is only by becoming conversant with such local nomenclature, and by overcoming the propensity which fishermen have of throwing away all "rubbish," that most valuable species may at times be obtained, and often in large quantities. Other sources which may be personally worked are lobster and crab pots, which are used in large numbers on the more rocky parts of the coast, and about which we hope to say more when we come to treat of the species which are most

* Reviewed in 'The Zoologist,' 1880 p. 153.

frequently taken in them. Shore-hunting at extra low tides and in good rock pools is very remunerative sport to the collector, many rare forms often turning up quite unexpectedly. Any shore after stormy weather will inevitably yield a good harvest of storm-tossed, but frequently perfect, specimens.

Having briefly referred to their capture, the next question which naturally arises is their preservation, and this has always appeared a serious difficulty. Should it be undesirable or inconvenient, as is generally the case, to set up the specimens at once, they must be preserved in such a way as to prevent decomposition, loss of colour, or breakage. For this purpose an admirable medium is Cooper's disinfecting salt, which we have found to be best used in a moist state. This is a new double salt formed of the chlorides of sodium and calcium, the action of which upon the soft parts of the integument forms an albuminate of lime.* Specimens which we have preserved in this manner have come out quite fresh and bright after an interval of many weeks. Simply bury the specimens, not in one mass, but distributed through the salt, in any ordinary tin or other box, large-sized biscuit tins being convenient.

We will now explain our *modus operandi* of preservation and arrangement for the cabinet. Specimens which have been in the salt must be carefully soaked and washed in fresh water before dissecting, in order that not a trace of the material may be left to crystallise on them afterwards. Freshly captured specimens should also be similarly treated, though not necessarily so thoroughly as the "pickled" ones. When this has been done drain off the superfluous moisture, and remove the carapace by cutting round the under edge with a knife, or, in the case of lobsters, prawns, and similar forms, remove the abdominal segments from the thorax, and then clean out as much as possible of the internal structure, even of the smallest specimen. A little powdered alum should then be sprinkled over the interior, and if the specimen be one with a thin carapace some cotton-wool, tinted according to the colour of the animal under treatment, may be inserted in order to restore the natural appearance which is lost by removal of the membrane lining the exo-skeleton. When

* This salt may be obtained (in bulk only) from Mr. Cooper, 7, Westminster Chambers, S.W.

the carapace has been readjusted, place the specimen on a piece of soft board, and arrange the legs, antennæ, eyes, when on long stalks, in symmetrical position with pins. Then place the specimen where it will dry slowly, but surely, without being exposed to too much heat or any light. It is important always to keep specimens as much as possible in the dark, or they will soon bleach. It is advisable, also, that they should never be exposed long for exhibition, and never in powerful sunlight. By attending to these simple directions a collection will retain its natural beauty for years, although, where form alone is the desired object, these precautions may of course be dispensed with.

It is scarcely necessary to observe that the frequent use of a note-book is most desirable, so that all particulars as to locality, mode of capture, condition of specimen and appearance when fresh, may be recorded. By this means valuable scientific facts are often preserved, and real assistance rendered to future students.

The embryology of the various species being a subject of great importance, is one upon which, from time to time, we hope to record our observations.

Zoæa, or larvæ of Crustacea, all of which are of the most remarkable form, have more than once been described as distinct species. Even the ova of the Crustacea are so remarkable and varied that it is not only possible to identify most of the species by an examination of their ova alone, but the habits of a species may often be ascertained by the manner in which these ova are attached to the swimmarets of the female specimen. The apparent discrepancy in relative size is also most striking. To illustrate this we will mention one instance:—The ova of *Axius stirhynchus* are larger than those of *Palinurus quadricornis*, although the average length of the former animal is three inches and that of the latter eighteen inches.

When treating of the British species in detail we propose to include the Crustacea of the southern shores of the British Channel, especially those species which occur in the Channel Islands. We shall also consider as British those obtained at a reasonable distance from our shores, whether in deep water or otherwise.

(To be continued.)

OCCASIONAL NOTES.

OTTERS IN HAMPSHIRE.—Although some of our few indigenous British quadrupeds are gradually becoming scarcer in some localities, it is gratifying to state that in this locality the Otter is still a “native,” although mercilessly persecuted whenever opportunity affords. During 1880 I know of some eight or nine having been caught. In the early part of the year a small specimen was shot by a man who was lying in wait for the morning “flight” of wildfowl, and as the year advanced one was killed in the New Forest. During the summer three or four were caught at different localities on the River Avon, and another—which I was told was a very large one—was caught in the little stream which divides the counties of Hants and Dorset, whilst another, much to the surprise of its captor, was trapped in a dyke at some distance from any main stream of water.—G. B. CORBIN (Ringwood, Hants).

SQUIRREL SWIMMING.—Never having heard of the Squirrel taking to the water, I send the following authentic communication. I had heard the story told by another person, and thinking it of sufficient interest I requested her to get it in detail from the lady under whose personal observation it had come. This the latter has most kindly complied with, and I forward it, trusting it may prove of interest to readers interested in the habits of animals:—“Mountquhanie, Cupar, Fife. When rowing two ladies down Loch Voil, one afternoon last August, I observed what looked like a little stripe of red-brown fur in the middle of the loch. On coming nearer we saw that it was a Squirrel swimming across, its tail lying flat on the water. We then heard its claws scratching on the side of the boat, and, to our surprise, the little bedraggled sprite appeared on the bow of the boat. It was evidently tired, for it sat quite still, staring at us and panting. I rowed on towards the shore, hoping to be able to ferry it across, but after a few minutes it scrambled down to the water again and resumed its journey, probably frightened at the sight of the collie dog which was in the boat. We watched it swimming till it looked like a small speck close to the shore, but lost sight of it before it landed.” Loch Voil, in Perthshire, near Balquhidder, is about four miles in length, with a mean breadth of about one-third of a mile—a considerable extent of water for so small a rodent to face and cross, in search, I suppose, of new nutting-grounds.—H. H. GODWIN-AUSTEN (Thalford House, near Guildford).—‘*Nature*,’ Feb. 10.

[Although the swimming powers of the Squirrel are not referred to in Bell’s ‘British Quadrupeds,’ and are unnoticed by many good observers who have written on the habits of animals, instances of this kind have been previously observed and recorded. See ‘*Zoologist*,’ 1872, p. 3272.—ED.]

THE WHITE-BEAKED DOLPHIN.—Allow me to correct an error into which Mr. J. M. Campbell has been led with regard to the destination of the skull of Mr. Brightwell's White-beaked Dolphin; it is not in the British Museum, as stated in the Museum 'Catalogue of Seals and Whales,' and elsewhere, but in the Museum of this city; the origin of the error I have explained at p. 422 of 'The Zoologist' for 1879. The Yarmouth specimen was landed on the 25th August, 1878, not 1876, as stated in 'The Zoologist' for 1881, p. 42. The skull of the latter is also in the Norwich Museum.—T. SOUTHWELL (Norwich).

BREEDING OF THE SNOW BUNTING.—I fear that Mr. Charles Whympers's beautiful drawing of the Snow Bunting's nest which embellishes the January number of 'The Zoologist' may convey to those who have never had the pleasure of finding or seeing one *in situ* an erroneous impression; and as I find that in my history of this bird, to which Mr. Cordeaux has referred in such kind terms, I have omitted to state, so prominently as I ought to have done, one remarkable and (so far as I am aware) invariable characteristic of its mode of nidification, I should like to say a few words on the subject here. The Snow Bunting is a bird in which I have taken very great interest ever since the time when I first made its acquaintance, and my opportunities of enjoying its society, especially in its breeding-haunts, have been numerous. I must have found for myself considerably more than a dozen of its nests, in every case by watching the movements of the hen-bird, and I must have seen *in situ* at least as many others, all found, if I remember right, in the same way. Not one of them was exposed to the sky, as is represented in the plate, and, from what I have heard or read of others, I think I am justified in declaring that the Snow Bunting does not build its nest in such a position, but always under cover. I may add that only in one instance do I remember having been able even to see the nest without removing the stems which protected it, and more than once, after I have found where it was placed, it has been quite inaccessible—owing to the long and tortuous hole, the size of the stones, and the absence of any engineering tools. In one single case only did accident assist me in discovering the nest, and even then so abundant were the chinks, in one of which I knew it was, that we had to wait till the hen-bird showed us which of them led to it. In all other cases the discovery was the result of patient and often long watching, but watching that was never wearisome to me; and I can only attribute the ill-success that has attended many attempts on the part of some no mean bird-nesters to bad weather or want of time. I must take this opportunity of demurring to the statement made by your correspondent, Mr. W. Oxenden Hammond (*supra* pp. 65, 66), as to his having seen a pair of Snow Buntings, in June,

1872, "in one of the highest and wildest passes of the Maritime Alps." I have little doubt that he has made the mistake which has been made many times before, as I have elsewhere remarked (Yarrell's Brit. B., ii., p. 8, note), and that the species observed by him was the Snow Finch, *Montifringilla nivalis*—a very different bird.—ALFRED NEWTON (Magdalene College, Cambridge).

BREEDING RANGE OF THE SNOW BUNTING.—With reference to the note by Mr. W. Oxenden Hammond (p. 65) on the occurrence of the Snow Bunting, as seen by him in the highest parts of the Maritime Alps in June, I think it very probable he has mistaken for our Arctic Bunting a very beautiful Alpine bird, the Snow Finch, *Montifringilla nivalis*, the "Alpen Schneefink" of the Germans. I am the more led to this conclusion from the fact that the locality stated as the nesting-quarters of his bird, a crevice under the window-sill of an Alpine cabin, is a very improbable position for the nest of a Snow Bunting, but a very probable one for the Snow Finch to choose. This pretty bird, which at even a short distance might easily be mistaken for the Snow Bunting, is in the summer an inhabitant of the highest and most desolate regions of the mountain ranges of Southern Europe, and here, far above the forest region and amidst perpetual snow, it finds a congenial home. It is said to nest beneath the roofs of the Hospice at the summit of the Great St. Bernard, but more frequently in some hole or crevice in the rocks. In a foot-note, 'Yarrell's British Birds,' ed. iv., vol. ii., p. 8, the editor, Professor Newton, remarks:—"The Snow Finch (*Montifringilla nivalis*), from its general resemblance to the Snow Bunting, has in several cases been the cause of error as to the occurrence of the latter in the South of Europe. The bill and hind claws, however, afford ready characters whereby the one bird may be distinguished from the other."—JOHN CORDEAUX (Great Cotes, Ulceby).

HABITS OF THE LYRE-BIRD.—At a meeting of the Natural History Society of Glasgow, held in that city on the 30th November last, the Chairman (Mr. John A. Harvie Brown) exhibited the egg and specimens of the tail of the male and female Australian Lyre-bird, *Menura superba*, and read an interesting communication from Mr. C. W. Arnott Stewart regarding the habits and haunts of this species, from personal observation during his residence in the colony. The home of the Lyre-bird is in the deep, well-watered gulleys, where the vegetation is very dense. Fern trees grow in large numbers, and to a great height, sometimes to nearly forty feet. Sassafras, myrtle, and here and there a giant gum-tree, add variety to the forest, these latter being often of great size, and reaching a height of nearly 500 feet. During the middle of the day the birds take up their quarters in these dark gulleys, and it is only in the evening and early

morning that they are to be found in any number on the mountain-sides. They are very shy, and exceedingly quick, so that it is no easy matter to shoot them in the bush, where there is so much cover. As they can only soar down hill, it is the custom when stalking them to begin at the bottom and work upwards. At the roots of the trees are seen mounds resembling mole-hills, but larger and more regularly formed, which have been scratched up by the male birds, and are their dancing beds, on which they dance and twirl, showing themselves off before the females. It is when amusing themselves in this way that the male mocks all the other birds in the bush, and so perfectly does it imitate them that it is only by its bringing in its own whistle now and then that it can be discovered. The nest is difficult to find, and is built of twigs, with an arch of the same over it, resembling the broad handle of a basket. It is said they lay only two eggs in the year, and the second is not laid until the first is hatched; but whether the same nest is used is not quite certain. The tail of the male bird brings seven shillings and sixpence, and is consequently much sought after; a good number are destroyed, but they are now protected by law during the breeding season. Dogs are sometimes employed for hunting them, and are trained to keep the birds in the trees into which they have hopped, by continually barking at them until those in search of them come up.

MIGRATION OF BIRDS.—At the same meeting, Mr. Harvie Brown read some notes on the migration of birds, with special reference to specimens of the Glossy Ibis, *Ibis falcinellus*, and the Esquimaux Curlew, *Numenius borealis*, which had been shot on the mud-flats at the mouth of the river Ythan, in Aberdeenshire, this year, and had been forwarded by Mr. George Sim, of Aberdeen, who gave the various measurements and contents of the stomachs of each. Some doubt was for a time entertained as to whether the Curlew was *N. minor*, the Asiatic ally, or *N. borealis*, but by comparison with other specimens it had been fully identified as being the latter species; but he thought the question of identity was not of much moment, because, bold as the assertion may appear, the matter of a few thousand miles in the migration of birds is comparatively of little importance, as the simultaneous appearance of rare migrants upon our coasts, hailing both from north-eastern and from north-western habitats has been noticed during the same prevailing winds, and at the same time. It is known that birds do not travel willingly directly with the wind, but prefer to fly against it, or partly against it, during migration, and the prevailing trend of migration is from east to west, or from south of east to north of west, as has been clearly shown by the lighthouses and lightships returns for 1879. He then gave particulars regarding the migration of rare species, other than those mentioned, and stated that the opinion of several naturalists who have paid attention to this subject has been gradually gaining ground, that a large proportion, if not all, of the sixty-seven species of North American birds which have from

time to time visited Europe, have not come from the west across the Atlantic, or *viâ* Iceland and the Færoes, but in company with the innumerable rare migrants which are annually identified on the island of Heligoland, and which have their breeding haunts in Siberia and Kam-schatka, and have come to us and other European countries from the east and north-east, across the great plains of Siberia, just as Pallas's Sand Grouse did when visiting Europe in 1873. He concluded by drawing attention to the importance of recording, along with the capture of rare birds upon our shores, the meteorological phenomena of the time of their arrival. Were this always done by the recorders some real service might be rendered to science by the accumulation of valuable data.

NESTING HABITS OF THE COMMON BUZZARD. — Near our village of Gosforth is a small valley, watered by the little River Bleng, and hence called Blengdale, which for the last four years has been constantly haunted by a pair of Buzzards. The sides of the valley rising abruptly on each side of the river are very steep and covered with grass. There are no crags, however, in it, and only some eight or nine trees, which trees contain every year three or four nests of the Carrion Crow. Rather than quit their accustomed ground, the Buzzards built their nest last year in a common thorn-bush growing about forty feet up the slope. Hearing of this unusual nesting-place, I went to examine it, but arrived too late. The nest was there, about eight feet from the ground, being apparently based upon an old crow's nest, but the three eggs, which were remarkably well-coloured specimens, had been taken that morning by a neighbouring gamekeeper. Exactly a month afterwards I revisited the locality, and found that the obstinate birds still held possession. About three hundred yards higher up the valley than the thorn-bush was a small "scar," twenty-five feet high, out of which grew a stunted tree holding a fresh nest containing three eggs, on which the hen-bird was sitting. Scrambling down to it from above, I found this second clutch almost as well coloured as the first three, which the keeper had meanwhile placed under a tame hen Buzzard. She sat upon them for thirty-one days, and hatched all three; but in spite of the united care of bird and keeper they all died when about ten days old. The old bird always sucked and chewed a piece of meat for three or four minutes before she gave it to the young ones. About three weeks afterwards we procured a half-grown Buzzard from a third nest on Seat Allan and gave it to the tame one to rear, but this also she failed to accomplish. I have four eggs in my collection which were laid by this tame Buzzard. On one occasion we put some hen's eggs under her, which she hatched and reared. Another tame Buzzard near here was hatched and brought up by a bantam-hen, the difference in size between the two being most absurd. The above case is only the second instance I have met with of a Buzzard nesting in a tree, as in this district they usually prefer

the cliffs and crags of our mountain-sides.—CHARLES A. PARKER (Gosforth, Carnforth).

GREAT GREY SHRIKE NEAR RINGWOOD.—On the 8th of November when walking near the river, my attention was attracted to the number of Pied Wagtails flitting here and there over the reed-beds; this, however, being a usual habit of the birds in question at that season of the year, it excited but little surprise. I noticed that large numbers of them were congregated at a particular spot at some considerable distance from where I was standing, and that they seemed all noise and commotion. Curiosity prompted me to watch for the cause of this apparent uproar, and presently I saw a bird rise up from the vicinity of the reeds, closely pursued by the whole body of Wagtails. I was quite at a loss to say what bird it could be, as it was so far off. At first sight I thought it was a Fieldfare from the length of its tail, but I noticed—although it soon settled again—that its flight was different, being undulating, and reminding one somewhat of that of the Green Woodpecker, or even of the Wagtails themselves. Being continually mobbed, at last the bird rose high over the river, and fought its way through the host of its tormentors to some tall trees not far from me. I then distinctly saw it was a Great Grey Shrike, and was much interested, as it was the first living specimen I had ever seen. When it had settled amongst the trees the Wagtails left it, satisfied, I suppose, that they had driven it from their own quarters, but it was a curious sight to watch the determined manner in which the Wagtails made their attacks, and the turnings and twistings of the Shrike in its endeavours to evade them. On returning from my walk the Shrike had disappeared, and I have not seen or heard anything of it since. I may state that I have a specimen which was killed near here on the 12th January, 1876, and I have seen another killed previously, but I am uncertain about the date of the latter. The bird I saw in November appeared to have a much lighter breast than the two above named, but this, I suppose, was a mark of its nearer approach to maturity. Since writing the foregoing I have heard that a Great Grey Shrike was killed in this neighbourhood at the end of November, and in all probability was the bird I saw.—G. B. CORBIN (Ringwood, Hants).

ROUGH-LEGGED BUZZARD IN SURREY.—On February 7th a fine specimen of the Rough-legged Buzzard was trapped by Martin, the keeper to my friend. Mr. Alfred Eastly, on his shooting near Chesham, Surrey. On inquiry Mr. Eastly writes me that three of these birds have been seen in the neighbourhood for some time past, and that a male was shot by Mr. Cheeseman, keeper, in October. The remaining one, a male, is still about. I can find no account of this bird being taken in Surrey before, and therefore think it worthy of note.—PHILIP CROWLEY (Waddon House, Croydon).

WREN'S NEST IN JANUARY.—On January 13th a farm-labourer took, at the village of Broughton, about a mile from this place, a Wren's nest with seven eggs in it, all quite fresh. Has such a find ever been made in January before? I do not recollect either to have heard or read of such a thing, and the fact seems to me worthy a line in your periodical. The weather for some time previous to the present severity was unusually mild.—JOHN H. WILLMORE (Queenwood College, near Stockbridge, Hants.)

IVORY GULL IN YORKSHIRE.—I have pleasure in recording the capture of the Ivory Gull by a York gentleman at Filey, in September last. I examined the bird myself at one of our York birdstuffers (who had it to case), and found it to be a male bird in perfect mature plumage, *i. e.*, entirely white. A young one was also captured the same month at Filey, and is in the beautiful mottled plumage of immature birds. These two birds are, so far as I can ascertain, the third and fourth respectively ever shot in our county. One of the previous ones is recorded by Yarrell as having been obtained in the neighbourhood of Scarborough, and the other one is mentioned by Mr. J. Cordeaux, in his 'Birds of the Humber District,' p. 203, as shot on the east coast of Yorkshire. I have also to record the capture of a male Smew and a male Goosander, both in splendid winter plumage, in the neighbourhood of Pickering. The gizzard of the Smew contained a fish like a small dace, and when I examined it was entire, except the head, which was probably digested.—J. BACKHOUSE, jun. (West Bank, York).

WHITE'S THRUSH IN DEVONSHIRE.—A good specimen of this Eastern Asiatic Thrush was killed by Mr. E. Studdy in Dene Wood, near Ashburton, Devon, during the severe cold weather in January last. It was in company with three or four birds of apparently the same species, and when flushed was mistaken for a woodcock from its heavy flight. The species was first observed in England in 1828, as recorded by Yarrell, and the example now under notice appears to be the ninth that has been obtained in England since that date. The species is best known from Japan and China, and was described by Pallas under the name of *Turdus varius*. The specimen last killed was exhibited by me at a meeting of the Zoological Society on the 15th inst., and the species was fully recognised.—E. W. H. HOLDSWORTH (84, Clifton Hill, St. John's Wood.)

[This makes the sixteenth instance in which *Turdus varius* has been reported to have been met with in the British Islands. A dozen instances are recorded in the 'Handbook of British Birds,' published in 1872, since which date four others, including that above noticed, have been recorded. See 'Zoologist,' 1874, p. 3880; 1879, p. 133; and 1880, p. 68.—ED.]

ERRATA.—P. 54, for "Royal Philosophical Society," read "Royal Physical Society of Edinburgh." P. 66, for "Felbrigge," read "Selbrigge."

MEMOIR OF THE LATE JOHN GOULD, F.R.S.

ZOOLOGICAL science has sustained no slight loss in the death of Mr. John Gould, F.R.S., which took place at his residence in London, on the 3rd February last, at the ripe age of seventy-seven.

For more than forty years Mr. Gould's name has been intimately associated with Ornithology, of which science he was justly regarded as one of the leading exponents; and the magnificently illustrated folios which he published from time to time have rendered his name familiar, not only to naturalists all the world over, but to those whose positions and means enable them to cultivate a taste for the artistic and beautiful.

Mr. Gould's first important work, 'A Century of Himalaya Birds,' appeared in 1832. This was followed in 1834 by his 'Monograph of the Toucans,' a second edition of which was published in 1854. In 1837 he commenced his 'Icones Avium,' which was completed the following year, and which contained descriptions and figures of many new and rare birds from different parts of the world. In 1837 also his important work on the 'Birds of Europe,' in five vols. folio, was finished, and it was on the completion of this that he conceived the idea of visiting Australia, with a view to investigate its then almost unknown fauna, and attempt a general history of the Ornithology of that vast region so interesting to naturalists. To accomplish this, it was evident that a personal visit to Australia was necessary, for without this it would be impossible to furnish more than the bare nomenclature and description of form and colour of such species as might at uncertain intervals be collected and transmitted to him. To gain a just and accurate knowledge of the habits, manners, migration, food, and nidification of the birds of Australia, subjects on which next to nothing was then known, he felt that he must himself sojourn in their native wilds, and watch them in the grassy plain, the tangled bush, and the gloomy forest. Animated by the spirit of a Wilson or Audubon, he determined to leave England for Australia, and trust for the repayment of the heavy expenses which such an expedition would entail, to the success of his work, to which, that it might be

worthy of public patronage, he resolved to devote his time, mind, and resources.

No sooner was the determination made than it was executed. Accompanied by Mrs. Gould, whose pencil was to be employed to illustrate his work, and also by an able assistant, in the person of John Gilbert, who afterwards, unfortunately, lost his life at the hands of the treacherous natives of the west coast during Leichardt's Expedition, he left England in May, 1838; and in September of that year arrived at Van Diemen's Land. Here he spent ten months in exploring that island and the islands in Bass's Straits. By way of interlude, however, he paid a short visit to New South Wales.

This hasty trip, which he extended to the Liverpool range, prepared Mr. Gould for his great expedition, and enabled him to procure both specimens and skins of the Lyre bird, *Menura superba*, the former of which he transmitted to Professor Owen for dissection. While in Van Diemen's Land, he was most cordially received by the Governor, Sir John Franklin, whose Polar Expedition all are familiar with, and who, being himself a man of science, and consequently capable of appreciating the value of Mr. Gould's undertaking, afforded him every assistance. While making Van Diemen's Land and Bass's Straits the theatre of his operations, Mr. Gould took the opportunity of visiting Flinder's Island, interesting from its intermediate situation between the Australian Continent and Van Diemen's Land. Some of its productions, as might be anticipated, are common to both; its general fauna, however, is that of the latter.

While in Van Diemen's Land, Mr. Gould separated from his principal assistant, John Gilbert, whom he sent to the western coast of the Australian Continent, while he himself proceeded to the south coast, making Adelaide his rendezvous. Here he was liberally supported in the prosecution of his enterprise by the Governor, Colonel Gawler, and Captain Sturt. By these gentlemen he was furnished with the requisites for a campaign, and with trusty attendants. According to the advice of Captain Sturt, Mr. Gould proceeded to explore the Bush, or "Great Scrub," which, for the extent of a hundred miles, borders the Murray; and he advanced nearly to the west bend of that noble river. The Scrub which Mr. Gould penetrated stretches over a

dead level, and is about twenty miles in width and a hundred in length. It is composed of a close mass of brush-like trees, amongst which dwarf *Eucalypti* and *Pittosporums* are abundant. In this vast plain, which Captain Sturt, in his overland journey from Sydney to Adelaide, had previously traversed, and where he was struck with the novelties around him, Mr. Gould remained between two and three months, and was well rewarded for his toil by the riches of the country, to him not desert, but tenanted by beings of the highest interest—birds and mammals new to science, and of varied forms and habits.

From this wilderness, which the foot of white man had seldom trod, and which no zoologist had ever explored, he descended to the coast, and crossed to Kangaroo Island. In this spot, covered with a dense forest of *Eucalypti*, but which holds out no inducements to the settler (for forests do not here, as in America, indicate the value of the soil to the colonist), Honey-eaters were hovering about the flowers, and glancing in the sun; and the rugged coast was tenanted with Hawks and Eagles, which there find a secure abode. The Wallaby Kangaroo was seen in herds, and other mammalia were also plentiful.

Desirous of being in New South Wales at the breeding season of the birds, Mr. Gould now left the southern coast, and arrived at that place in August. Here he received from the Governor-in-chief, Sir G. Gipps, the most important assistance, given in the most kindly spirit. Two or three trusty convict servants were assigned to him, and he was further supplied from the government with tents, and the necessary utensils and materials for leading the life of a bushman. His attention was first directed to the thick tracts of brush and the small islets at the mouth of the River Hunter. These islets consist of a deep alluvial soil, and are covered with the most luxuriant vegetation, the densest foliage. From the midst of a thick underwood rise numerous palms and huge fig-trees, entwined by creepers of the most graceful and fantastic forms. Birds of the richest hues, Honey-eaters on restless wings, Regent-birds, Satin-birds, and beautiful Wood Pigeons (*Vinago*) enlivened by their presence these umbrageous wilds, and added charms to the scenery. It was here that Mr. Gould met with that extraordinary bird, the wattled Talegalla, or Brush Turkey of the colonists, of which so little was previously known that naturalists were divided as to whether it belonged to the vultures or the gallinaceous birds.

From the mouth of the Hunter, Mr. Gould tracked its course to its rise in the Liverpool range of hills, stopping in various parts for the purpose of collecting specimens and making observations. Fortunately for him it happened that a near relative (a brother of Mrs. Gould), Mr. S. Coxon, resided on the Dartbrook, a branch of the Hunter, nine miles from the base of the mountain chain. Here Mr. Gould not only occupied a most favourable position, but was enabled to command every advantage requisite both to render his examination of the flat tracts of this district successful, and also his excursions to the range itself, in the ravines and gullies of which he encamped for some time. This mountain range, which abounds with Lyre-birds, Black Cockatoos, and with many species of Kangaroo, is about one hundred and sixty miles from the sea at Newcastle, and two hundred and thirty east of Sydney, forming the limits of the colony in that direction. Hitherto Mr. Gould had only explored the country between the coast and this mountain chain, but the districts beyond these mountains were too inviting, and promised too many novelties to the naturalist, to be left unvisited. Accordingly he made preparations for crossing the range, and pushing his way to the distant interior by way of the Liverpool plains, which stretch out from the base of the mountains. In the accomplishment of this enterprise Mr. Gould was materially assisted by Mr. Coxon, who supplied him with bullocks and drays. He started on this expedition in December, with a party consisting of five Europeans and two intelligent natives, whose services he found highly valuable. After encamping for some time on the Rivers Mokai and Peal; he descended the Namoi, to the distance of about two hundred miles from the mountains. As was to be expected, he found the productions of these plains altogether of a different character from those between the mountains and the coast at Sydney. In the place of forests of timber or vast plains of brush, the country was for the most part open, covered with a peculiar vegetation of grasses, and here and there variegated with thinly-timbered forests. Thousands of beautiful Grass Parrakeets, and flocks of the little Crested Parrot (*Nymphicus*), and of Rose-breasted Cockatoos, were seen in every direction, restless and busy. The elegant Frill-neck (*Calodera nuchalis*), a bird of extraordinary habits, graced the woods with its presence; but neither the Satin-bird, the Regent-bird, nor the

Wood Pigeon, were to be seen. Emus were wandering over these plains, uttering their hollow, drumming notes, and troops of Kangaroos were quietly reposing in their primitive pasture-grounds. Of the latter animals Mr. Gould discovered several new species, some of gigantic size, and capable of overcoming the strongest and boldest of his dogs.

After an absence of six months Mr. Gould returned to Sydney, where he received letters and collections from Gilbert, who subsequently proceeded to the north, making Port Essington his principal station.

We have said that, while making Van Diemen's Land the centre of his operations during the first months of his arrival, Mr. Gould paid a hasty visit to New South Wales. It happened to be during one of the severest droughts ever known in the country. Little or no rain had fallen for fifteen months; the rivers and pools were all dried, the land was a parched waste, vegetation was burnt up, and famine was spreading destruction on every side.

When, after an absence of five months, however, Mr. Gould returned to the same place, an extraordinary change had passed over the face of the country. The rain had copiously fallen, and the plains on which but a short time previously not a blade of herbage was to be seen, and over which the stillness of desolation reigned, were made green with luxuriant vegetation. Orchids and thousands of flowers of loveliest hues were profusely spread around, as if Nature rejoiced in her renovation; and the wheat shooting up vigorously, gave promise of a plenteous harvest.

Suddenly hosts of caterpillars made their appearance, and inundating the country commenced their work of devastation; but not unchecked, for in the train of these destroyers came vast flocks of birds attracted by their prey. Hawks of three or four species, in flocks of hundreds, were busy at the feast; and thousands of straw-necked Ibises (*Ibis spinicollis*) and other birds were performing their allotted parts and benefitting man, while they revelled in the profusion of, to them, a welcome banquet.*

* For most of the details above given of Mr. Gould's travels in Australia we are indebted to an article in the 'Westminster Review,' written, if we are not mistaken, by the late Mr. D. W. Mitchell, on the appearance of the first part of the 'Birds of Australia,' which was published in December, 1840.

Mr. Gould had now been actively and successfully engaged for two years in collecting not only the birds, but the mammals and other natural productions of Australia; and in that space of time had gained, as he said, "a rich harvest of knowledge." Many considerations now induced him unwillingly to return to England, and after a safe voyage he arrived in London in August, 1840, bringing with him as the fruit of his enterprise the finest collection of natural history specimens which it has perhaps never fallen to the lot of one man to procure. Not the least interesting portion consisted of the nests and eggs of all or nearly all the species (numbers of them new to Science) of which he had a series in every stage of plumage.

He at once prepared to utilise these collections, and having paved the way by the issue of his 'Synopsis of the Birds of Australia,' 1837-38, commenced his magnificent work on the 'Birds of Australia,' in seven folio volumes, which, being issued at intervals in parts, was not completed until 1848, and was followed by a supplement in 1851. Before the publication of this important work had commenced, however, such was his industry that he had completed, in 1838, a Monograph of the Trogons, a group of birds inhabiting America, India, and Africa, whose beauty and brilliancy of plumage is surpassed only by the Humming Birds. Of this a second edition was subsequently produced between the years 1858-75. In 1844 he commenced his Monograph of the American Partridges (*Odontophorinæ*), and in 1849 a Monograph of the Humming Birds (*Trochilidæ*). This beautiful work, appearing in parts at irregular intervals, was not completed until 1861, in which year Mr. Gould published, in convenient octavo form, his useful Introduction to the *Trochilidæ*. During the year of the first International Exhibition, Mr. Gould's collection of Humming Birds was exhibited at the Zoological Society's Gardens, in a building expressly set apart for the purpose. While the work on the Humming Birds was still in progress, he commenced his 'Birds of Asia' (1850-80), and this was followed in turn by 'The Birds of Great Britain,' five vols. (1862-73), with an octavo introduction to the same (1873), 'The Mammals of Australia' (1863), and 'The Birds of New Guinea' (1875-80). All these are in folio, with coloured plates. His account of the birds collected during the voyages of H.M.S. 'Beagle' and 'Surphur,' both of great interest to

ornithologists, were published in quarto in 1841 and 1844 respectively.

Perhaps the most useful of Mr. Gould's octavo works is his 'Handbook to the Birds of Australia,' published in two vols. in 1865; for, appearing as it did nearly twenty years after the folio work on the same subject, it not only contained numerous additions and descriptions of new species, but gave to those who could not afford to purchase the more costly folio the latest information concerning Australian birds. At this date (1865) Mr. Gould was enabled to enumerate in round numbers no less than 660 species of Australian birds, the discovery of a great number of which was due mainly to his own exertions.

Elected a Fellow of the Zoological Society in 1840, having previously been a corresponding member, he took an active part in the scientific meetings, which were frequently enlivened by his accounts of the discovery of new and beautifully-plumaged birds which he exhibited. His descriptions and papers were published from time to time in the 'Proceedings of the Zoological Society,' the 'Zoological Journal,' and the 'Annals of Natural History.' The catalogue of scientific papers compiled and published by the Royal Society (of which Mr. Gould was a Fellow) shows that up to the year 1873 no less than 229 separate papers had emanated from his busy pen.

It is impossible to review so large a contribution to zoological literature as is embodied in Mr. Gould's works without being convinced of two things. His publications have given the greatest possible stimulus and encouragement to the prosecution of zoological research, and the perfection to which he brought hand-coloured lithography may be said to have inaugurated a new era in the art of zoological illustration. No more beautiful coloured representations of mammals and birds can be found than those which adorn his own folios.

In this large series of beautiful volumes Mr. Gould has certainly raised an enduring monument to his own fame, for they will be quoted and referred to till the end of time.

NOTICES OF NEW BOOKS.

Siberia in Europe; a Visit to the Valley of the Petchora in North-East Russia. By HENRY SEEBOHM, F.L.S., F.Z.S. With Map, and Illustrations by Charles Whymper and other Artists. London: John Murray. 1880. [Second notice.]

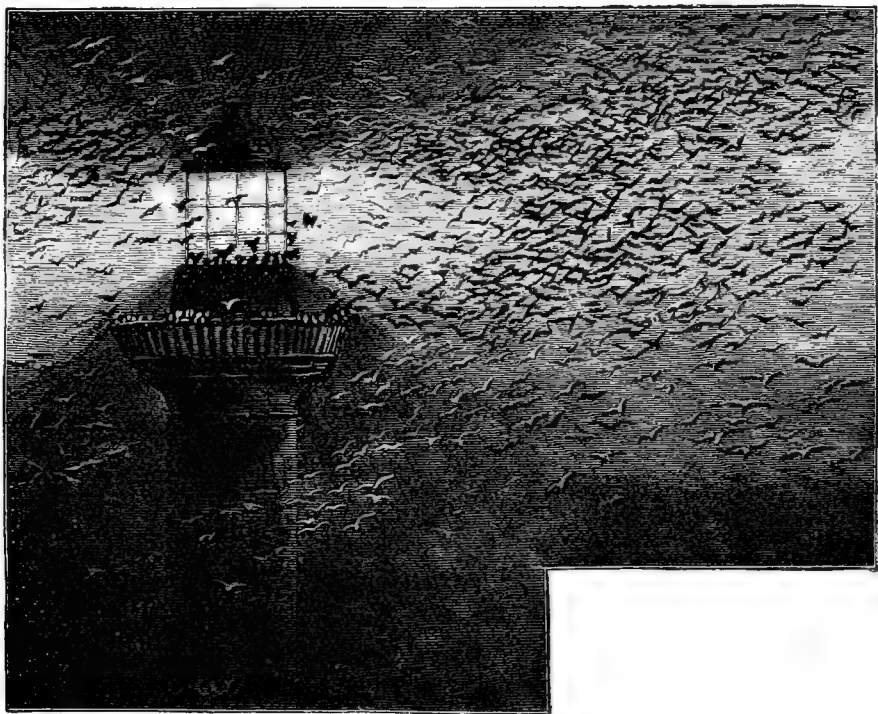
IN the review of this book, which appeared in our last number (p. 75), a curious mistake occurred in regard to the two illustrations there given. These, although originally prepared for the work, were not used, two others intended to represent the same scenes (pp. 175, 262), being substituted for them. None of them having been drawn by Mr. C. Whymper, who has furnished the best illustrations in this book, we have unintentionally



WILLOW GROUSE.

done an injustice both to author and artist. Through the kindness of the publisher, however, we are now enabled to rectify this by giving three characteristic illustrations of bird-life from the pencil of Mr. Whymper, to which we will append Mr. Seebohm's observations relating to them.

On the tundra, near Stanavialachta, Willow Grouse, says Mr. Seebohm, "were as plentiful as Red Grouse on the Bradfield moors on the 12th. Their white wings, their almost entirely white bodies, made them very conspicuous objects. They usually rose within shot from a patch of willow cover. Sometimes we would see a pair knocking about the tundra, like two big white butterflies with a peculiar up and down flight, then they would go tumbling into a willow-grown knoll on the hill side. It might be owing to their extreme conspicuousness that their flight always seemed so much more clumsy than that of the Red Grouse. One of their nests which we found on the ground contained a baker's dozen of eggs. It was a mere hollow scraped in the turf, lined with a leaf or two, a little dry grass, and a few feathers."



THE LIGHTHOUSE AT HELIGOLAND ON A MIGRATION NIGHT.

On the subject of migration, as observed at Heligoland, Mr. Seebohm has some very interesting remarks (pp. 249—261). He visited this island on his return from Siberia, and arriving just on the eve of the autumnal migration, for the observation of which Heligoland is so admirably situated, he was naturally

anxious to observe for himself what may be regarded as one of the most wonderful sights which can gladden the eyes of an ornithologist. The previously published observations of Mr. Gätke, of course, had already prepared him for a good deal, but his preconceived ideas on the subject, it would seem, fell far short of what he was enabled to realise by personal observation.

Being desirous of visiting the lighthouse at night, when large flocks of birds were passing over on migration, he requested that he might be called at the earliest opportunity which might present itself. He was accordingly awakened one dark night about half-past twelve with the news that the migration had commenced, and hastened at once to the shore. He thus describes what he saw:—

“Arrived at the lighthouse, an intensely interesting sight presented itself. The whole of the zone of light within range of the mirrors was alive with birds coming and going. Nothing else was visible in the darkness of the night but the lantern of the lighthouse vignetted in a drifting sea of birds. From the darkness in the east, clouds of birds were continually emerging in an uninterrupted stream; a few swerved from their course, fluttered for a moment as if dazzled by the light, and then gradually vanished with the rest in the western gloom. Occasionally a bird wheeled round the lighthouse and then passed on, and occasionally one fluttered against the glass like a moth against a lamp, tried to perch on the wire netting, and was caught by the lighthouse man. I should be afraid to hazard a guess as to the hundreds of thousands that must have passed in a couple of hours; but the stray birds which the lighthouse man succeeded in securing amounted to nearly 300. The scene from the balcony of the lighthouse was equally interesting; in every direction birds were flying like a swarm of bees, and every few seconds one flew against the glass. All the birds seemed to be flying up wind, and it was only on the lee side of the light that any birds were caught. They were nearly all Sky Larks. In the heap captured was one Redstart and one Reed Bunting. The air was filled with the warbling cry of the Larks; now and then a Thrush was heard; and once a Heron screamed as it passed by. The night was starless, and the town was invisible; but the island looked like the outskirts of a gas-lighted city, being sprinkled over with brilliant lanterns. Many of the Larks alighted on the ground to rest, and allowed the Heligolandiers to pass their nets over them. About three o'clock a.m. a heavy thunderstorm came on, with deluges of rain; a few breaks in the clouds revealed the stars; and the migration came to an end, or continued above the range of our vision.

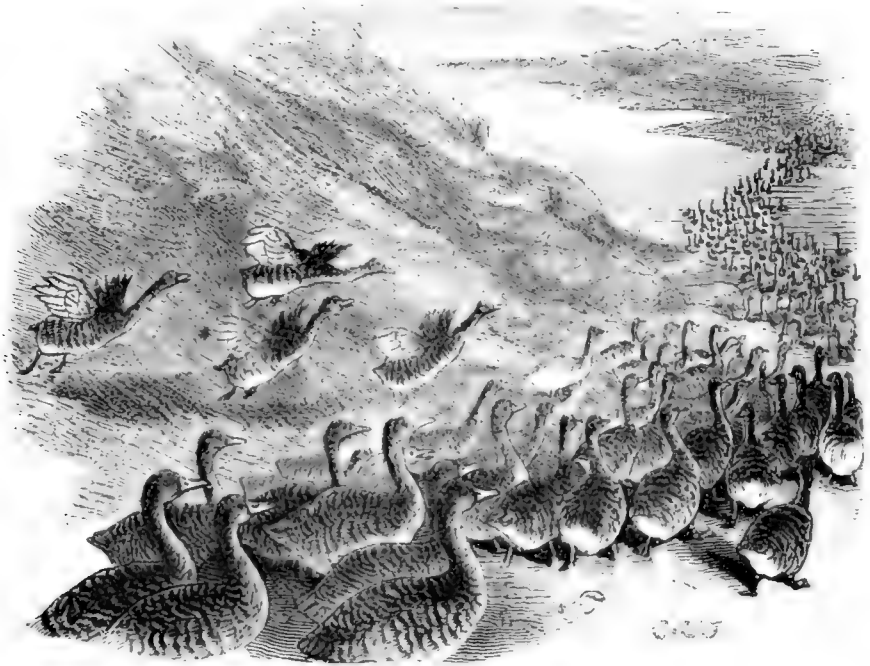
"The conclusion I came to after my Heligoland experience was that the desire to migrate was an hereditary impulse, to which the descendants of migratory birds were subject in spring and autumn, which has during the lapse of ages acquired a force almost, if not quite, as irresistible as the instinct to breed in spring. On the other hand, the direction in which to migrate appears to be absolutely unknown to the young birds in their first autumn, and has to be learnt by experience. The idea that the knowledge of where to migrate is a mysterious gift of Nature, the miraculous quality of which is attempted to be concealed under the semi-scientific term of instinct, appears to be without any foundation in fact. It appears that each individual bird has to find out its proper winter quarters for itself, and learn the way thither as best it may. That birds have keen organs of sight is a fact well known to all who have watched them obtaining their food or eluding their enemies. That they must have wonderful memories for place is shown by the distance they roam from their nests, and the concealed spots in which they seem to have no difficulty in finding them again. Amongst true migratory birds, that is amongst birds which have a winter as well as a summer home, as distinguished from gipsy migrants who perpetually loaf about on the outskirts of the frost during winter, continually changing their latitude with the temperature, it appears to be a general rule that the farther north a species goes to breed the farther south it goes to winter. It is not known if this applies to individuals as well as to species."

Apropos of this subject, we may refer to a curious migration of Wild Geese, of which an illustration is given, observed by Mr. Seeböhm while crossing the interior of the tundra near Bolvanski Bucht. He says (p. 282):—

"I had not gone more than a mile when I heard the cackle of geese. A bend of the river's bed gave me an opportunity of stalking them, and when I came within sight I beheld an extraordinary and interesting scene. One hundred, at least, old geese, and quite as many young ones, perhaps even twice or thrice that number, were marching like a regiment of soldiers. The vanguard, consisting of old birds, was halfway across the stream; the rear, composed principally of goslings, was running down the steep bank towards the water's edge as fast as their young legs could carry them. Both banks of the river, where the geese had doubtless been feeding, were strewn with feathers, and in five minutes I picked up a handful of quills. The flock was evidently migrating to the interior of the tundra, moulting as it went along."

When referring in our former notice of this book to the breeding of the Curlew Sandpiper (p. 79), we alluded to the

Knot, *Tringa canutus*, as one of the birds whose nesting haunts still remain undiscovered, and whose eggs still remain to be described. This is not quite accurate, for although we have never seen an authenticated egg of this bird, and are not aware that one is to be found in any collection in Europe, it is nevertheless true that the Knot was found years ago breeding on Melville Peninsula, as well as on the North Georgian Islands



MIGRATION OF GEESE.

(now better known as the Parry Islands);* while Capt. Fielden during the last Polar Expedition procured an old Knot with the young in down in Discovery Bay (lat. $81^{\circ} 44' N.$).† The eggs found on Melville Peninsula are described as “of a dun colour, fully marked with reddish spots.” There can be no doubt, however, that we have yet a good deal to learn about the nesting habits and haunts of this species.

* See Sabine, *Greenl. Birds*, p. 533; Parry's *First Voy., Suppl.*, p. 201; Parry's *Second Voy., Append.*, p. 355; Richardson and Swainson, *Faun. Bor. Am. (Birds)*, p. 387.

† See ‘*The Ibis*,’ 1877, p. 407, and Nares's *Voy., Append. vol. ii.*, p. 211.

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ON THE "HUMMING" OF THE SNIPE.

BY THE EDITOR.

[THE articles on this subject, by Dr. Altum and others, which have appeared in recent numbers of the 'Ornithologisches Centralblatt,' seem to have re-opened the discussion of a question which is of much interest to naturalists. As the time of year is approaching when the "humming" of the Snipe may be heard by all who have opportunities of observing this bird in its breeding haunts, it will perhaps be agreeable to the readers of 'The Zoologist' to have a translation of the articles referred to, or at least of such portions of them as are material. This accordingly will be here attempted, and may be prefaced, not inappropriately, by an article on the subject which was contributed by the Editor of this Journal some years ago to the Natural History columns of 'The Field' (27th April, 1872), and which, it is believed, fairly states the case, and the points in dispute.]

AMONGST the many rural sounds which greet the ear of the vagrant naturalist in spring, none is more remarkable than that produced by the Common Snipe in pairing time. This peculiar sound, which is never heard except from a bird on the wing, has been variously termed "humming," "drumming," "neighing," and "bleating," according to the fancy of the auditor, and nothing has puzzled naturalists more, perhaps, than to discover how this noise is produced.

Amongst German ornithologists especially this has been a favourite theme for discussion, and various have been the opinions expressed by eminent observers on the subject. Some, like Bechstein, have maintained that the sound is emitted through

the bill; others, like Naumann, considered it to result from a vibratory movement of the wings; whilst the most remarkable theory (that of Herr Meves) is that it is produced by the outer tail-feather on each side as it is drawn rapidly through the air in the bird's descent. Let us see what foundation there is for these various opinions. As the noises made by birds usually proceed from the throat, it seemed but natural to suppose at first that the "humming" of the Snipe was similarly produced. But, as the bird has been observed close enough to see that sometimes the bill is closed when the sound is heard, while at other times the well-known cry of "chook-chook-chook" is uttered simultaneously with the "humming" sound, it becomes evident that the latter cannot be produced through the throat. In favour of the wings there is a good deal to be said, and here it will be desirable to refer to the peculiar position of the bird at the time the "humming" is produced.

On rising from the ground the Snipe mounts to a good height, and often flies to some distance before anything unusual is observed. A few rapid beats of the wing are then given, and, with half-closed pinions and spreading tail, the Snipe is seen to fall through the air in a sloping direction, as if about to re-align. At a distance the wings then appear to be motionless, but on a nearer view a tremulous movement in them is observable. It is during this descent, and at no other time, that the peculiar "humming" sound is heard. Its continuance may be thus described:—For five seconds the bird gives rapid strokes with the wings; during the next five it falls through the air as described; in the succeeding five it rises again for a similar interval, only to fall at its expiration as before, and these movements are continued alternately until the bird at length re-aligns in the fen. From the peculiar vibration of the wings in the downward descent of the bird, it would appear that the primaries, instead of firmly overlapping each other, are, in the act of "humming," turned broadside to the air, which is thus able to play across the inner web of each, and so impart to each a vibratory motion and consequent sound—faint, indeed, in the case of a single feather, but audible enough when an entire wing is acted upon. Whether this be the true explanation of the singular sound, it is of course not easy to prove conclusively; but it has certainly been accepted as such by many naturalists in

England, who are the more inclined to adopt this view from having observed that Peewits, Rooks, Gulls, and other birds, with tails very different from that of a Snipe, make an analogous sound when falling through the air. In the Peewit especially this sound is remarkably loud, and can be heard at a considerable distance by anyone who approaches in the nesting time the vicinity of its eggs or young. In the case of this bird, however, the sound seems to be produced more for the purpose of attracting the attention of the intruder and leading him from the nest.

The "theory of the wings," then, might possibly have met with general approval, had it not been for the ingenious discovery of the Swedish naturalist Meves, whose original observations were first made known to English readers through the instrumentality of a well-known English ornithologist, the late John Wolley. While on a visit to Herr Meves at Stockholm, Wolley learnt from him that an accidental misprint of the word representing "tail-feathers" instead of "wing-feathers" first led him to think on the subject. He subsequently examined the tail-feathers of different species of Snipe, blew upon them, and fixed them on levers that he might wave them with greater force through the air; and finally hit upon an ingenious contrivance which to his mind, and subsequently to the minds of many others, demonstrated that the "humming" is produced by the outer feathers of the tail.

This discovery was announced to English readers in an article which Wolley translated and communicated to the Zoological Society in April, 1858, and which was published in the Society's 'Proceedings' for that year. As this article, however, appears to have received comparatively little notice in this country, and certainly not that attention which it deserves from naturalists who, residing near the summer haunts of the Snipe, are best qualified to decide the question, I have thought it desirable, by a repetition of Herr Meves's theory, to give English observers an opportunity of testing its value at a time of year when the humming sound may be heard by anyone who will take the trouble to visit the nearest Snipe-ground. Herr Meves says:—

"The peculiar form of the tail-feathers in some foreign species nearly allied to our Snipe encouraged the notion that the tail, if not alone, at all events in a considerable degree, conduced to the production of the sound. On a closer examination of the tail-feathers of our common species, I found

the first (outer) feather, especially, very peculiarly constructed; the shaft uncommonly stiff, sabre-shaped; the rays of the web strongly bound together, and very long, the longest reaching nearly three-fourths of the whole length of the web, these rays lying along the shaft like the strings of a musical instrument. If you blow from the outer side upon the broad web, it comes into vibration, and a sound is heard, which, though fainter, resembles very closely the well-known 'neighing.'

"But to convince one's self fully that it is the first feather which produces the peculiar sound, it is only necessary carefully to pluck out such a one, to fasten its shaft with fine thread to a piece of steel wire a tenth of an inch in diameter and a foot long, and to fix this at the end of a four-feet stick. If now you draw the feather, with its outer side forward, sharply through the air, at the same time making some short movements or shakings of the arm, so as to represent the shivering motion of the wings during flight, you produce the 'neighing' sound with the most astonishing exactness.

"If you wish to hear the humming of both feathers at once (as must be the case from the flying bird), this also can be managed by a simple contrivance. Take a small stick, and fasten at the side of the smaller end a piece of burnt steel wire, in the form of a fork; bind to each point a side tail-feather; bend the wire, so that the feathers receive the same direction which they do in the spreading of the tail as the bird falls through the air in flight; and then with this apparatus draw the feathers through the air as before.

"Such a sound, but in another tone, is produced when we experiment with the tail-feathers of other kinds of Snipe. But in *Scolopax major*, *capensis*, and *frenata* are found four humming feathers on each side, which are considerably shorter than in the species we have been speaking of. *Scolopax javensis* has eight on each side, which are extremely narrow and very stiff.

"Since in both sexes these feathers have the same form, it is clear that both can produce the 'humming' noise; and by means of experiment I have convinced myself that it is so. But, as the feathers of the hen are generally less than those of the cock bird, the noise also made by them is not so deep as in the other case."

This is the theory upon which I should be glad to hear some expression of opinion from English naturalists. I have tried the experiment for myself, and have succeeded beyond expectation in producing a sound like the "humming" of the Snipe; but I am still sceptical. In the first place, the outer tail-feather is not the only one which will emit a sound on being drawn through the air in the manner indicated, although I must admit that it is the only

one which will make so loud and so good an imitation of the Snipe's "humming." But any of the primary wing-feathers will give forth a faint sound, which may be increased in proportion to the number of them passed through the air at once.

Again, it does not appear to me clear that the position of a tail-feather at the end of a long switch when drawn through the air is identical with the position which it would occupy in the tail of the bird when flying downwards. On the contrary, it would seem that the reason why the tail-feather emits a sound at the end of a switch is because it is drawn through the air, in a position which is occupied naturally by the primaries, but unnaturally by the tail, and hence that it must be the primaries (collectively) which produce the sound in nature. In this our sense of hearing is assisted by the sense of sight, for a perceptible vibration of the quill-feathers is observed every time the bird descends.

In the case of Peewits, Rooks, and other birds, it may be said that the sound which they produce in falling through the air is by no means identical with that produced by the Snipe. True; but it is an analogous sound, and the fact that they are able, with very different tail-feathers, to make a sound of this nature at all, seems in itself a strong argument against the tail-feather being the agent in producing it.

In offering these remarks for the consideration of naturalists, it must not be supposed that I wish to disparage in any way the extremely ingenious theory of Herr Meves, which has met with the approval of many ornithologists: at the same time it may be observed that this theory is by no means universally accepted, and in expressing my own adherence to the "theory of the wings" I am supported by the opinion of many excellent field-naturalists.

The late Sir William Jardine wrote:—"The sound is never heard except in the downward flight, and when the wings are in rapid and quivering motion; *their resistance to the air, without doubt, causes the noise* which forms one of those agreeable variations in a country walk, so earnestly watched for by the practical ornithologist."

Mr. John Hancock, in his 'Catalogue of the Birds of Northumberland and Durham' (1874), devotes several pages (pp. 106—113) to a consideration of this question, and gives his entire

* 'The Naturalists' Library' (Ornithology), vol. xxvi., p. 180.

adherence to the "theory of the wings." His remarks, too long to be quoted here, are most interesting, and ought to be read *in extenso* by all who have not already formed an opinion on the subject.

The late Dr. Saxby, once a frequent contributor to the pages of this Journal, has discussed the matter in his 'Birds of Shetland,' and at page 204 of that work observes:—"The many years' intimate acquaintance with the bird and its habits which I have enjoyed confirms me in the now generally received opinion that *the 'drumming' is produced by the vibration of the wings alone.*"

The most recently published testimony on the subject, with the exception of the German articles already referred to, is that of Capt. W. V. Legge, who, in the Appendix to his admirable work on the Birds of Ceylon, has expressed a very decided opinion on the subject, based on his own personal observation. As this will probably be new to many readers of 'The Zoologist,' it may be here appropriately quoted. Capt. Legge says:—

"The most favourable occasion I had for observation was on the evening of the 10th June [in Wales], when a Snipe having young near where I was standing, 'drummed' over my head, flying backwards and forwards in the manner now to be described, without cessation, for a period of fifty-two minutes, timed by my watch. * * * * *

The aerial course taken by the bird was an ellipse, of the average length of a quarter of a mile, described over where I stood; but it was sometimes varied by her making a figure of 'S' above my head, the bird always returning to its original starting-point in the air, and again making the same tour. The movement for the purpose of 'drumming' was generally performed twice, but sometimes thrice, going and coming, making from four to six times in each figure described. It flew at a height of about 100 yards with a quick and regular movement of the wings, and 'drummed' in this wise:—The body was suddenly turned on one side and the bird descended rapidly for about 100 feet at an angle of 45 degrees, moving its wings with very rapid and powerful strokes, its tail being at the same time opened to the utmost; having arrived at the lowest point of its descent, it suddenly turned its body in the reverse direction, that is, elevated the wing which had been before depressed, and with a short upward sweep ceased the drumming noise and rose to its original position, continued its course for a short distance, and then descended with the same rush again. The movement was always performed with the same wing pointed downwards throughout one half of the bird's course; that is, if it commenced to drum with the left wing down when flying from east to west, that wing was

inclined downwards the next time it descended, until the course was altered, and the bird flew back from west to east, when usually the other wing was inclined towards. The instant the bird commenced its descent, the 'drumming' noise was heard, and it continued till it finished off with a sort of whiz directly the upward sweep, by which the bird recovered itself, was performed.

"By closely watching the bird it could be distinctly *seen* that the vibrations falling on the ear *coincided exactly with the beat of the wings*, which, assisted by the downward rush through the air, were the *primary* cause of the sound. The tail, however, was spread as I have already remarked, and to such an extent that it took the form of a fan, the lateral feathers being at right angles to the centre; and herein lies the *secondary* cause of the sound. During the drumming beat of the wing, the quills are more drawn back than in the ordinary strokes (this can be observed if the bird be closely watched), so that the atmospheric wave or air propelled by the powerful stroke of the wing is drawn through the rigid, sabre-shaped and opened-out feathers of the tail, thus making the peculiar noise."

Thus, in the opinion of Capt. Legge, the sound is produced *by the combined action of wings and tail*: he suggests a compromise, in fact, between the adherents of the "wing-theory" and "the tail theory," reminding one of the old story of the disputants about the gold and silver shield!

In the 'Ornithologisches Centralblatt' (1st Oct., 1880), Prof. Altum has an article on this subject, in which he relates a curious story, for the truth of which he vouches, and which he adduces in support of his own view that the tail-feathers alone are instrumental in producing the sound in question. We need not translate the article *verbatim*, but, for the sake of brevity, will give the substance of his remarks. He says:—

"With regard to my theory of the 'bleating' (*meckern*) of the Snipe,* published in 1855, namely, that the expanded tail-feathers cause the sound, and which theory was afterwards immaterially modified by my attributing the sound to the outer tail-feathers only (for with these, at least, the sound can be imitated), I refer to the 'Naumannia' for 1855 (pp. 362, 499).

"By means of the experiment with a tail-feather on a wire, I had no difficulty in bringing foresters hitherto sceptical or altogether averse to the theory (I could adduce a goodly list of well-known names) to an unqualified

* "Bleating" appears to me to be a very inappropriate term, for it implies a vocal effort on the part of the bird, which Dr. Altum does not suggest.

concedo. In spite, however, of my own conviction, confirmed by experiment, two adverse cases reported by a forester caused me still to reflect upon it. In both cases a Snipe was said to have been observed 'bleating' as it sat, or rather stood, on a little elevation of the ground. From my point of view this seemed to me impossible, and I therefore attributed the forester's statement to a delusion on his part, caused by his having supposed that the sound from an unseen Snipe high in air proceeded from the bird which he saw sitting close at hand. I have since received from our Academician, Herr Alexander Schmidt, the following highly interesting piece of evidence:—In March, 1880, in his teaching district, Neuhausel, he shot a Snipe which he only winged. He carried it alive in his hand and against the wind. Suddenly it began to 'bleat' softly, the tail being stiffly expanded and the air blowing on the web of the feathers producing such a sound as would be caused by blowing on a knife-edge. To convince himself on the subject, Herr Schmidt moved the bird rapidly against the wind, and found his object fully attained. For a good half-hour he had the satisfaction of letting the expanded tail-feathers 'hum' as he pleased in the way indicated. The sound differed in no respect from that produced by a pairing Snipe at large. With the knowledge of this fact, the last doubt as to the origin of this much-talked-of sound should be set at rest.

"This seems to prove, first, that the tail-feathers, without the aid of the wings, produce the sound, for the wings of the bird in question were laid close to the body and restrained by the hand; and, secondly, that the sound may be produced from a Snipe sitting on the ground when subjected to only a moderate opposing wind as described. In conversation with several of our Academicians on this circumstance, two of them, Herr Schilling and Herr Goebel, informed me that they had heard a Snipe 'bleat' upon the ground, and the former distinctly remembered that a strong breeze was blowing at the time."

In a subsequent number of the '*Ornithologisches Centralblatt*' (15th Nov., 1880), Herr Zöppritz, of Darmstadt, confesses his inability to accept this story, and, admitting that the forester referred to heard the sound in question while he held a wounded Snipe in his hand, suggests that he was under a misapprehension as to the way in which it was produced. He says:—

"As is already known, much has been written on this subject, especially in Cabanis' '*Journal für Ornithologie*' and in the '*Naumannia*,' without any definite settlement of the question being arrived at. Two years ago, in Waidmann's '*Sporting Journal*,' I published an article on this subject, wherein I offered to pay a fine of 500 marks to the treasury of the '*Allgemeine Deutsche Jagd-schutz-verein*,' if three umpires appointed by the '*Verein*' publicly declared (with their names subscribed) that they were

convinced that Snipes produced their bleating notes, not through their vocal organs, but by means of their wings, with or without the help of their tail-feathers.

"Now, however, Prof. Altum, in Dankelmann's 'Blätter für Forst und Jagd-wesen' (Orn. Centralbl., 1st Oct., 1880, p. 149), has brought forward a new observation thereon, which is so extraordinary, that it cannot possibly be passed over in silence. He asserts that the sound is caused by the tremulous movement of the outer tail-feathers of the bird when precipitating itself with great rapidity. Naumann, on the other hand, says that one may convince oneself by sight (all the better with a telescope) that Snipes 'bleat' by means of a rapid vibration of their wings. These wholly opposite views, of which one is to be convinced by sight, prove nothing more than the absolute fallacy of this means of proof. Both naturalists are agreed that, by means of a tail-feather fastened to a stick or wire, and moved hither and thither through the air, the sound can be pretty well imitated. In theory this is right, but the actual experiment proves that the sound thus produced is not audible at more than seventy yards distance, while the 'bleating' of the Snipe can be heard through the calm air ten times as far. This means of proof is quite as valueless as that of sight.

"A distinct contradiction to these assertions is furnished by Bechstein, who stated, seventy years ago, that he had often heard Snipes 'drum' as they sat on dead boughs of trees. This was corroborated by 'Dietrich aus dem Winckell,' in his 'Handbuch für Jäger,' through a friend, on whose authority he could rely, and who had twice heard Snipes 'drum' from dead boughs. W. Hintz reported in 'Naumannia' (1854, p. 90), amongst other observations, that during his apprenticeship he had at least ten times seen and heard Snipes 'drum' from dead oak-boughs in a marsh, and what he had seen and heard he strongly asserted. Subsequently, 'Graf E. E.,' in 'Waidmann' (vol. ix., part 17), reported that an observant sportsman had heard a Snipe 'drum' while sitting on a telegraph-wire.*

"The observation above referred to, as reported by Prof. Altum, is to the effect that a winged Snipe, held in the hand, 'bleated,' not with its bill, but with its widely extended tail-feathers! To convince himself of the sound, the experimenter moved to and fro with the bird, and found his object achieved, making the tail-feathers hum loudly, just like the sound of a bleating Snipe. This assertion seems so extraordinary, that it must be regarded as a delusion, for one can only arrive at the reasonable conclusion that so long as Herr Schmidt's Snipe was held in the hand it 'bleated' from pain or fright, not that the 'bleating' was caused by the expanded tail-feathers moving to and fro in the air—an idea which it is absolutely

* We have heard a similar sound from telegraph-wires when there was no Snipe sitting there!

impossible to accept. More than twenty-five years ago people assumed the 'tail-theory' to be proved by moving a stick with a tail-feather attached violently to and fro. To-day they may obtain the same proof by holding a Snipe's tail in the hand and moving it repeatedly to and fro! Comprehend this who may!

"If we make the experiment with a tail thus expanded, we shall find that no sound is audible. In short, taking everything into consideration, of all the grounds advanced in support of the wing and tail theories, none in my opinion stand proof. Anyone with any knowledge of mechanics, or physics, if he sufficiently examines a dead Snipe, must be convinced that so small a bird, with wing- and tail-feathers so comparatively weak, cannot possibly produce sounds with them which are at such a distance so sharply accentuated. Hence I indulge the hope that the adherents of the wing and tail theories will now withdraw their opinions and acknowledge that 'to err is human.'"

To this article Dr. Altum, in the 'Ornithologisches Centralblatt' (15th Jan., 1881), has replied, briefly, as follows:—

"After recording the new facts imparted to me by Herr A. Schmidt, I should have felt no occasion for writing further on this subject, but should have contented myself with the assurance that I have many supporters in my theory, had it not been that Herr Schmidt has been placed in a somewhat disparaging light by Herr Zöppritz. I was pleased to see, in 'Ornithologisches Centralblatt' (1880, No. 22), that his expressions were more modified, and that Dr. Reichenow (the editor) in his notes had broken the point of many of Herr Zöppritz's objections. Nevertheless, I feel myself called upon to defend Herr Schmidt's reputation for veracity, which has been called in question through my publication: and it can do no harm to have the facts placed before us in a clearer and more detailed manner than was formerly done.

"Referring to the contents of the article just mentioned, Herr Zöppritz gives the following reasons for disputing the 'tail-theory,' or, shall I say, in proof of the 'throat-theory':—(1) The bleating sound produced by the feather and wire does resemble the Snipe's 'drumming,' but it is too weak; (2) There is no analogy to be found in the bird-world; (3) Herr Schmidt has been mystifying us; (4) Anyone with the slightest knowledge of mechanics or physics would be convinced, on examination of a dead Snipe, that my opponent's theory is untenable.

"These are the reasons which are to induce every opponent to 'withdraw, and acknowledge the truth of the saying "to err is human."' If Herr Zöppritz could give me his word that he had held a living Snipe in his hand, or kept one in captivity, and had seen and heard its 'throat-bleating' in his own immediate presence, I would lower my colours, and say no more

of 'mystification,' &c. When a fact has been unequivocally attested by a man of honour, discussion is at an end. Such a man is our Forstcleve, Alexander Schmidt; and he gives his word of honour for the absolute truth of the following account:—

“ ‘In the week preceding Easter, 1880, I had been shooting Snipe on an extensive marsh, much frequented by these birds, which lies near my home (a little north of Baumbach, a village in the Unterwesterwaldkreis, Hesse-Nassau). One of the Snipe was but slightly winged. Intending to place it in a meadow at home, and use it to train my young dog, I picked it up with my right hand, carefully folded the wounded wing, and started on my twenty minutes' walk towards home. A cold sharp east wind was blowing in my face. Suddenly I became aware of a hollow vibratory sound. I looked around in astonishment, and discovered at last that this sound proceeded from the Snipe in my hand. The bird repeated this noise many times, while at the same time it spread out the little uninjured tail-feathers in the form of a wheel. When I had observed the way in which each separate feather was set in vibration by the wind, it became easy to strengthen the sound by moving the bird more quickly against the wind, whilst it held its tail stiffly spread out. There was absolutely no difference between this sound and the well-known 'drumming' of the Snipe, as I had heard it thousands of times in that neighbourhood, and especially on quiet evenings, when it was audible at a great distance. I made the same experiment several times in presence of my father, who is a forester, and other relatives, and then used the bird as I had originally intended. I have related this fact to many experienced sportsmen and foresters in that neighbourhood. They were interested in the occurrence; but it was by no means new to them, for they had always regarded the tail-feathers as the vehicles of sound, although they had not sought for any particular verification of this belief.’

“Such are the facts which have lately excited so much difference of opinion in sporting journals.”

ORNITHOLOGICAL NOTES FROM MAYO AND SLIGO.

BY ROBERT WARREN.

THE fine dry warm weather of the summer of 1880 proved most favourable to small birds, and especially so to the summer migrants, which in this district appeared in larger numbers than usual; and the numerous young birds seen later in the season about the hedges and plantations, contrasting with the few seen during the previous summer, also proved how favourable was

the season of 1880 for their increase. Some of the summer birds appeared to have instinctive knowledge of the prospect of a fine summer, or at least we may infer so from the fact of the very early arrival of the Chiffchaff and others.

On the 20th March a Chiffchaff appeared here in full song, and was heard almost daily throughout the season. Sandwich Terns were seen on the river and estuary on the 24th, nearly a fortnight earlier than in 1879. Willow Wrens on the 19th April, ten days earlier than the previous season. Swallows and Martins were also seen on the 19th, somewhat later than in 1879; Whimbrels on the 1st May; Corn Crakes on the 2nd; Cuckoos and Swifts on the 12th and 13th; Common Terns on the 14th; a Sedge Warbler on the 15th; and our latest visitors, the White-throats and Spotted Flycatchers, on the 19th May.

With regard to the losses caused by the arctic winter of 1878-79 amongst various species, some birds had regained their usual numbers; for instance, the Blackbirds and Robins; while the Missel Thrushes and Song Thrushes have not nearly come up to the average, being still very scarce in this locality. Common Wrens and Tits are also very scarce.

On June 29th I went round the estuary in my punt to see if any of the winter birds had lingered on about the sands instead of leaving for their northern breeding-haunts. I only met with a few Godwits; one having a white head and neck puzzled me at first, before I made out what it was. On July 10th I saw some Greenshanks and Redshanks at Roserk, just come back from their breeding haunts. On the 22nd I heard a Whimbrel, and saw Lapwings assembling in flocks after the breeding season.

The number of Starlings which visited us last autumn was very small indeed, not a twentieth of the number which usually frequented the district previous to the winter of 1878-79; but whether their scarcity can be attributed to the losses of that severe winter or to the foreign-bred birds shifting their line of migration to some other quarter, it is hard to say, though perhaps both causes combined may account for the scarcity. Want of food cannot be the cause, for the wide extent of pasture-land where they fed in both counties (Mayo and Sligo) is quite as extensive, if not more so, than ever.

Of our winter visitors the first to put in an appearance was the Widgeon, a few being seen on September 2nd, but these

probably had been bred in some of the remote mountain loughs, for the main flock did not arrive in the Estuary until about the middle of November. On September 28th I saw near Bartragh either a young male or female Scaup Duck. A few Redwings appeared about our trees here on October 9th; they were very restless, flying about from one wood to another, as if not knowing where to settle down; but in the course of a week they settled on our hawthorn hedges, and were joined by others later on, so that by the end of the month they appeared to have arrived in their usual numbers, as if they had quite recruited the losses of 1878. Fieldfares were very scarce; they appear, like the Thrushes, to be increasing very slowly.

The weather became very cold and squally by the 20th October, the low temperature continuing throughout the week, the mercury in thermometer falling to 28° on the night of the 27th, and on the following day, when in my punt near Roserk, I was surprised at seeing a Wheatear hopping about the stones on the shore; it looked quite healthy and lively, not showing any appearance of suffering from the cold.

On the 2nd November I saw a little party of Golden-crested Wrens in one of our hedges, the first seen here since 1878, the cold of that winter having apparently cleared them out of this district altogether. These birds were probably migrants, it not being likely they had bred in the neighbourhood.

We had quite an invasion of Bullfinches last autumn and winter; they were to be seen in almost every hedge throughout the district, both on the Mayo and Sligo side of the Moy, and although not more than three or four birds could be seen together at any time, yet they were generally distributed. This migration of such numbers was the more remarkable from the fact that I have seldom seen more than three or four birds in a season in this neighbourhood.

The flocks of waders which visited us last winter were much smaller than usual; even the Curlews were much under the average, and neither Redshanks nor Greenshanks were numerous. Golden Plover were very scarce, and I never remember so few Lapwings being about the sands, the early frosts having driven them out of this locality. There was a fair promise of them at the end of the summer, when the flocks began to assemble after the breeding season, but they soon shifted their quarters elsewhere.

As if in intimation of the severe weather of January, we had—what is most unusual in this locality—some very sharp frosts in the middle of November, the mercury falling to 27° , 25° , and 24° on the nights of the 16th, 17th and 18th. However, the weather became mild for the rest of the month and the early part of December; again, in the last week of that month, a smart frost set in for a few nights; but this went off, and on the 7th January a frost so hard set in as to stop all farm work, such as ploughing or digging, and on the 11th some snow fell, followed by more on the 12th, covering the ground nearly to a depth of seven or eight inches, accompanied by such intense frost that night that the mercury fell to 11° , and as the bogs and loughs became frozen over, great numbers of Wild Ducks were driven down to the sands next day. The small birds then began to look poorly, for the snow that fell was so fine and dry that it penetrated into and under every bush and hedge, leaving no place uncovered where they could feed, consequently all had to take to the shore to search for food amongst the stones and sea-weed. On the 14th I saw about the shore and sands, Rooks, Magpies, Blackbirds, Thrushes, Fieldfares, Redwings, Larks, Titlarks, Starlings, Hedge-sparrows, Robins, Stonechats, Chaffinches, and a few Yellowhammers, and found a Redwing starved to death.

We began feeding the small birds on the lawn close to the door, but found it almost impossible to prevent the Rooks eating up everything, although they were fed with the fowls in the stable-yard. With the addition of Missel Thrushes and Black-headed Gulls, and some Tits, all the above-mentioned birds came to be fed, but notwithstanding a regular supply of food was frequently put out during the day, yet the numbers of each kind coming to be fed diminished daily, so that when the thaw set in on the 26th our poor pensioners had dwindled away to eight or ten Blackbirds, two or three Thrushes, and an odd Starling or two, but of course the Rooks were in full force and numbers, though some had become very weak. The Yellowhammers and Finches mostly kept near the barn-door, where they had an abundance of refuse corn and seeds, and therefore were better off than the other birds. We had more snow on the night of the 15th, and the cold was so severe that the thermometer registered 25° of frost, which covered the tidal part of the Moy from Castleconnor Point to above the Shipping Quay with a thick coat of ice, completely closing the

navigation of the river, which did not re-open until the 28th, when the rising spring-tide burst the icy barrier.

On December 17th there was another fall of snow, increasing in depth on the level parts of the country to twelve or fifteen inches, but much deeper where it drifted into the hollows; this fall closed up everything, and as it froze on the trees and bushes when falling, it made the poor birds far more wretched. All the Woodcocks left this part of the country, and very few Snipe remained, and these were afterwards nearly all shot or trapped at the few unfrozen springs where they came to feed. The fog was so thick I was unable to go down the river, but while waiting in my punt, hoping the fog would rise, I got a pair of Tufted Ducks and a Scaup with my shoulder gun; they were all immature males. The frost and snow still continuing, nine Wild Swans visited us, and rested for some hours on the water just opposite where I keep my punt, but an easterly wind blowing hard prevented my launching her and following them, so they got off unmolested for the time. On the night of the 20th the frost was so intense that on the following morning all the bays and inlets were closed in by ice, which covered all the flats of the river and estuary, and as the *Zostera*-covered bay where the Widgeon generally feed was also covered by ice, and owing to the low neap tides was not floated off, the poor birds were half-starved. Large numbers of Wild Ducks lay on the ice all day, and although I made several attempts to get at them, I was unable to force the punt through the ice within shot, though once, after working through for over two hundred yards, I stuck fast when almost within shot, and had to back out again, much disappointed at my bad luck, for over a hundred Ducks were lying on the ice as closely packed together as they could lie. Curlews and Black-headed Gulls now began to die off, and some Ducks and Wild Geese that I shot were almost useless, they were so thin; but most of those killed up to this date were in fair condition. Small birds were dying off, and some of the Rooks looked very weakly, though they returned to their carnivorous habits and were killing and eating weaker birds. I saw one killing a poor Black-headed Gull, and observed two others tearing at a dead bird of their own species.

On the night of December 21st the cold was again very intense, the thermometer registering 24° of frost, and the poor

birds at once began to show the effects of this, those which came to be fed having their feathers ruffled, and many of them when feeding sitting on the ground with their legs drawn up into their feathers, fearing the pain of the frozen ground. A flock of eighteen Wild Swans crossed over the river; they did not rest, but passed on direct for Killala. I found a Curlew unable to fly, but although I crammed him with some raw meat, he was too far gone, and died the following day. The Black headed Gulls were so starved, that numbers fed with the small birds on the window-stools of the houses in the streets of Ballina; and Mr. W. Little, of Ireland Cottage, near Ballina, who fed the Gulls regularly during the frost, had a flock of about fifty Gulls so tame that whenever he appeared outside his door they all flew close round him like a flock of tame Pigeons. He fed them on bread, cutting up two or three large loaves every day.

On December 23rd the frost was not so severe, the mercury rising to 40° at 9 a.m., and standing so all day. This rise of temperature caused a remarkable change in the appearance of many of the birds we were feeding; they became quite smart and lively, with their plumage smoothed down and close. But towards dusk all this was changed, the frost setting in again, and with such intensity that before morning the thermometer registered 19° of frost, and the poor birds looked worse than ever.

On December 24th, when going down the river, I met with an adult male Shoveller, in most brilliant plumage, and although I was anxious to secure him, I did not fire, fearing to injure him too much by the heavy charge of my punt-gun. That night was exceedingly cold, the thermometer indicating 21° of frost, so that on the morning of the 25th there was more ice than ever about the shores of the river and estuary; and as all the feeding-grounds of the Widgeon were covered, some flocks were so starved that wherever they found any small feeding-place thawed by the tide they would return to it in a few minutes after being fired at, the noise of the gun only scaring them to a short distance.

However, better times were near at hand for all birds, for on the night of December 26th a light thaw with snow set in, and became so confirmed and rapid the following day, that some grass began to appear on the highest parts of the fields, which on the 28th were sufficiently free from snow for the cattle and sheep to

feed. This was a great relief to them after living for sixteen days deprived of all green food.

This long period of twenty days of hard frost and sixteen days of deep snow, coming so soon after the hard winters of 1878-79 and 1879-80, must have had a most disastrous effect on our small birds, and more especially on those species whose numbers had not recovered the previous losses; while the berry-eating birds, such as Missel Thrushes, Fieldfares, Redwings, &c., must have suffered considerably, for a poor supply of haws was all cleared off by the middle of November.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 101.)

II. STRUCTURE.

CONTINUING our remarks, we now propose to give, for the benefit of intending students, a short outline of the general features which characterise the structure of this class of animals, more particularly with a view to affording some explanation as to the technical terms, which we may find it necessary to use, in describing or referring to the various species under consideration. We have already referred to Professor Huxley's able work, 'The Crayfish,' which we have adopted as a guide in following the broad lines of structure, and to which we would again refer the student in his study of form and development of Crustacea.

The chief feature of this class is that they possess an external skeleton, which is known as the EXOSKELETON. This, being composed principally of carbonate of lime with a comparatively small proportion of phosphate of lime, is naturally rigid, and not expansive or contractile; hence the necessity for a frequent casting of the shell which is such a prominent feature in the economy of these animals. It is well known that when the growth of the animal has so far advanced that a fresh shell or case is necessary for its comfort and further development, there takes place what is termed "exuviation" or "ecdysis"; that is, the old shell is entirely cast off, even to the covering of the eyes and

the chitinous membrane of the stomach. After this operation, as might be expected from their unprotected condition and defenceless state, the animals are of a retiring disposition, until the expanded body has formed a new secretion of lime; in other words, a new exoskeleton. This exuviation takes place frequently during the early life of the animal, but not so often in adults. There is, we think, some difficulty even yet as regards our knowledge of this period of exuviation, for we have just preserved a specimen of *Lithodes maia*, which, if size be any proof of age, was only half-grown. This specimen was just on the point of casting its shell, which was, however, covered with fine living *Balani*, or barnacles, more than two inches in height.

We may here mention, as regards the mature female of many species, that it is just after exuviation, and when the new shell is still soft, that pairing usually takes place.

Another remarkable feature of the life-history of the Crustacea is their power of reproducing lost limbs; under these circumstances the ease with which they part with limbs under the influence of terror will be understood. This dislocation takes place at the narrowest joint of the imprisoned or injured limb, and the bleeding which ensues coagulates over the wound. The new limb is first produced in the form of a small tubercle, which enlarges at each successive casting of the exoskeleton, but which probably rarely attains to the size of its corresponding member. Species of the genera *Xantho* and *Galathea* are especially subject to this voluntary dismemberment.

Reverting now to the subject of structure: the exoskeleton is divided roughly into three parts or regions—namely, the CEPHALON or head, the THORAX, and the ABDOMEN. In the *Brachyura*, or Crabs, the head and thorax are united in one roughly oval or circular case, whilst the abdomen is but slight and bent under the thorax, fitting into an aperture between the leg-joints. In the *Anomoura*, among which may be instanced the Hermit Crabs, many of the forms have the thorax and head more elongated, and the abdomen soft and devoid of segments, protected by insertion in the dead valves of Mollusca. The *Macroura* (or Lobster forms) have the thorax and head generally cylindrical, and the abdomen developed into arched segments. These segments are decisively separated, but the division of the head and thorax is only marked externally by a cervical groove, although the interior

structure clearly indicates where this boundary really occurs. The segments already referred to are termed SOMITES, the lower wall of which is the STERNUM, to which in the abdominal region the swimmerets are attached. These last appendages each consists of a stalk or stem, which is composed of a very short basal joint, the COXOPODITE; next to which is a long cylindrical second joint, the BASIPODITE; the whole stem being called the PROTOPODITE. The swimmerets differ widely in different species, many of the *Brachyura* having them of a decided plumose structure—no doubt a necessary apparatus for the protection of ova, which, when discharged, are attached in a group by a viscid stalk to the coxopodite, each mass of ova being shielded by the above-mentioned swimmerets. This formation of the ova in distinct groups is not general, but may be well observed in *Hyas coarctatus*. In others, however, they are attached severally and by separate ligatures; whilst in others, again, they appear in the form of long strings radiating from a common centre, as in the case of *Carcinus mænas* and *Corystes cassivelaunus*.

The tail appendages, differing slightly as they do in different genera of *Macroura*, may be broadly described as consisting of a fan-shaped arrangement of plates, the centre one being called the *telson*, which consists of two segments. The appendages on either side of this are more or less fringed with a hair-like substance, and the whole apparatus, together with the abdominal somites, are capable of very powerful muscular contraction, so that the rapid backward motion in the water, of many species, is thus attributable to this remarkable development. *Scyllarus arctus* and the members of the genus *Galathea* are particularly characterised by this power. So sure is their course through the water, and so complete their control over the muscular energy of this fan-shaped repeller, that *Galathea strigosa* has been observed to dart backwards a distance of several feet, with most remarkable activity, straight into a small cleft in a rock, though the hole was barely large enough to admit its body.

The Suborder under our consideration is termed Decapoda, from the fact to which we will now refer, namely, the existence of ten feet, or legs, otherwise termed AMBULATORY APPENDAGES. These ten legs also vary in the different tribes, and must therefore be considered accordingly; but taking the second ambulatory leg of *Astacus fluviatilis*, as given in Prof. Huxley's work on 'The

Crayfish,' its segments consist, firstly, of a basal joint, the COXOPODITE, followed by the BASIPODITE, ISCHIOPODITE, MEROPODITE, CARPOPODITE, PROPODITE, and DACTYLOPODITE in succession. This limb may be taken as sufficiently characteristic to refer to when necessity requires such reference.

In the *Macroura* the first pair of legs are generally developed into broad hands and forceps, the development of which is strikingly varied in the different genera and tribes; for in the *Palæmonidæ*, for example, they are but slightly enlarged, the second pair being the larger. Again, in *Nephrops norvegicus* they are long, fluted, and tuberculated; whilst in *Homarus marinus* (= *vulgaris*) they are broad and massive. Perpetual discrepancies also exist in some, as in the case of *Axius stirhynchus* and *Callinassa subterranea*, where one hand is very primitive, whilst its fellow is well developed. In the *Anomoura*, again, this variety also exists, the *Paguridæ* being characterised by one being large and the other small; whilst in the *Galathea* they are symmetrical, though again differing in point of detail, some being spinous and others scaly. In the *Porcellana* they are broad and flattened, being, in the case of *P. platycheles*, fringed with hair on the outer margin. In the *Brachyura* they are symmetrical, but vary from being attenuated and smooth, as in *Gonoplax angulatus*, and the same, only spinous, as in *Eurynome aspera*, to being vertically broad and hairy, as in *Atelecyclus septemdentatus*, and massive as in the case of *Cancer pagurus*. In the *Anomoura* the last pair of feet are either rudimentary or, if developed, of little practical value for walking; whilst the corresponding pair in the family *Portunidæ* have the last joint paddle-shaped: hence this family are known as Swimming Crabs. Many species have the terminal hook extremely sharp. This is particularly observable in the genus *Pisa*, where this sharp hook has the power of clenching its hold on such substances as branches of *Algæ*, &c., much in the same way as do many parasites, especially *Acari*.

Referring now briefly to the appendages situated in the front of the thorax, we find in the *Podophthalma* a pair of eyes fixed to stalks more less developed, and again exhibiting a remarkable variety of form, one species in particular, *Gonoplax angulatus*, having this stalk of considerable length.

The antennæ, like the eyes, consist of one pair, also varying greatly, and below these we find a pair of antennules; these

organs are divided above by a rostrum, which, from being prominent and serrated as in the *Palæmonidæ*, become a simple rounded continuation of the carapace, as in *Portunus arcuatus*. The development of new antennæ differs somewhat from that of the other limbs, for it is found in a spiral coil enveloped in a case, which, being thrown off at the period of moulting, the new organ uncoils and hardens into its normal position.

The mouth organs will be more fully considered when we come to the question of food.

The following is a short glossary of terms which we shall hereafter use, from time to time, in describing the external organs or parts of the *Podophthalma*. If any others should arise we shall explain them on the first occasion of their use.

ABDOMEN.—In the *Macroura* that part which commences at the end of the cephalothorax, commonly called tail; in the *Brachyura* and some of the *Anomoura*, that which folds under the cephalothorax (q. v.).

AMBULATORY APPENDAGES.—The legs used for walking.

ANTENNÆ, EXTERNAL.—The outer and longer feelers.

ANTENNÆ, INTERNAL, OR ANTENNULES.—The inner and lesser feelers.

ANTENNAL SCALE.—The flat process attached to the base of the antennæ in the *Macroura*.

AUDITORY ORIFICE.—A small orifice on the epistome (q. v.) near the base of the antennæ.

BASAL JOINT, OR COXOPODITE.—The joint next the carapace.

BRANCHIÆ.—The gills, or breathing organs.

BRANCHIAL CHAMBER.—The cavity in which the branchiæ are placed.

CARAPACE.—The upper covering of the cephalothorax (q. v.).

CEPHALOTHORAX.—The carapace and thorax, or that part before the abdomen.

COXOPODITE.—See **BASAL JOINT**.

EPISTOME.—The plate on the cephalothorax between the basal joint of the antennæ and the mouth organs.

EXOSKELETON.—The whole of the external shell or covering.

EYE-STALK.—The process which bears the visual organ.

FINGERS, OR FORCEPS.—See **HANDS**.

HANDS.—The terminal joint of the anterior legs, carrying the fingers, of which one only is movable.

MANDIBLES.—The organs of mastication.

MAXILLIPEDES.—The foot-jaws.

ORBITS.—The cavities wherein the eye-stalks are contained.

OVA.—The eggs, or spawn.

PALPUS.—The spine attached to the base of the external antennæ.

PEDUNCLE.—The stalk, or that part of the antennæ up to the third joint.

PEDIPALPS.—See MAXILLIPEDES.

PLEURÆ.—The peaked, lower lateral edges of the somites in the *Macroura*.

ROSTRUM.—The spine, prominence, or sword-like projection of the anterior portion of the carapace.

SETÆ.—The hair-like processes of the exoskeleton.

SOMITES.—The divisions, or segments of the head, body and tail.

STERNUM.—The chest, or under portion of the cephalothorax.

SWIMMERETS.—The abdominal appendages, used for swimming in the *Macroura*, and generally for the protection (in the females) of ova and zoeæ.

TAIL.—The anal portion of the abdomen.

TELSON.—The middle terminal plate or plates of the tail in the *Macroura*, and some of the *Anomoura*, which enclose the anal orifice.

TERGUM.—The upper or back part of the somite.

WRIST.—The joint next the hand.

ZOEÆ.—The larval form of Crustacea.

Although we have only alluded in a superficial manner to the characteristic points in the structure of the Stalk-eyed Crustacea, yet we venture to think it will be sufficient to enable the student to identify parts or limbs when peculiarities of form connected therewith call for description or reference in future observations on genera or species. It is not necessary for this purpose to touch upon the internal structure, on which, indeed, an entire volume might be written, and which would be of no utility in a paper treating of methods of identification by means of skeleton-structure and external form.

The first lesson in the study of this class of animals should be to procure a perfect specimen of, say, the common Lobster, *Homarus marinus*, or of the river Crayfish, *Astacus fluviatilis*; then, taking Professor Huxley's book, 'The Crayfish,' as a guide, dissect and clean the exoskeleton, attaching, to a board neatly covered with black or French-grey paper, each part, limb, appendage, or segment, placed a short distance apart, but in their relative positions; then, with a fine brush and a little pigment, place a small number close to each part; each number should correspond to one, either on a reference table at the foot of the board, or in a note-book. This table or note-book should contain full descriptions of the various articulations, which will become soon familiar to the student by thus practically working out the specimen.

(To be continued.)

OCCASIONAL NOTES.

THE WHITE-BEAKED DOLPHIN.—On reference to the MS. of my note on this subject (p. 103), intended to correct an error of date in a previous communication by Mr. J. M. Campbell (p. 42), I think you will find that I wrote “the Yarmouth specimen was landed on the 25th August, 1879, not 1878 as stated in ‘The Zoologist’ for 1881, p. 42.” By an unfortunate printer’s error I am made to say (p. 103), “the Yarmouth specimen was landed on the 25th August, 1878, not 1876, as stated,” &c. This is to be regretted, as making confusion worse confounded. Let me repeat, therefore, as briefly as may be, that the Yarmouth specimen was landed on the 25th August, 1879.—T. SOUTHWELL (Norwich).

RED-CRESTED DUCK IN CO. KERRY.—A specimen of the Red-crested Whistling Duck (*Fuligula rufina*), was shot at Tralee by a local fowler on January 20th, 1881. I saw it skinned by Rohu, the Cork naturalist, and have the trachea, which exactly corresponds with “Yarrell’s” engraving. You will note that Thompson, in his admirable work on the ‘Natural History of Ireland,’ states that he never heard of a specimen of this duck being obtained in Ireland; and till now I do not think it has ever been noted as a visitant to this country.—R. PAYNE GALLWEY (Cork).

[The bird, which was exhibited by Mr. A. G. More at a meeting of the Zoological Society on March 15th, is undoubtedly a male *Fuligula rufina*, concerning which Mr. R. J. Ussher has been good enough to send us some further particulars in the shape of a letter from the person who killed it, Mr. Victor M’Cowen, of Tralee. He reports that he shot it on the 18th January, not the 20th, as above reported, early in the morning; that it was quite alone, and rose from a spring in a marshy field about a quarter of a mile from the town. The occurrence of this species as an occasional wanderer to the British Islands has been noticed on some sixteen different occasions in various parts of England since 1818, when it was first recorded as having been killed in Breydon Harbour, Norfolk. Only once has it been procured in Scotland, as reported by Mr. Gray in his ‘Birds of the West of Scotland,’ and, until the occurrence of the example now before us, had not been met with in Ireland. Its occurrence so far westward as Tralee is remarkable, seeing that the bird is a native of South-Eastern Europe, North Africa, and Asia. In some parts of India it is particularly common. Mr. Lockwood, if we remember rightly, in his ‘Natural History and Sport in India,’ gives a graphic description of the appearance of a flock of several hundreds of these birds as viewed at close quarters from a boat on an unfrequented reedy lake. When it is stated that the bill, eyes, and feet are

bright red, the head chestnut, breast black, and flanks white, it may be imagined how attractive must be the appearance of a flock when seen in undisturbed enjoyment of their natural haunts.—ED.]

WILDFOWL IN LEADENHALL MARKET.—Thinking that the Arctic weather of January would probably bring some rare birds to Leadenhall Market, I took the opportunity while in London to pay several visits to that emporium of wildfowl; nor was I altogether disappointed, for I counted sixteen kinds of Wild Ducks, and an unusual number of Geese, of six species. Two, the White-fronted and the Bean, were particularly numerous. The White-fronted is always common, but I have, in a previous winter, found the Bean very scarce, and almost impossible to get. On January 26th a curious variety of the immature White-fronted Goose was hanging up. In this species the under surface is white or greyish without any bars, in its first winter, but when adult it is crossed with deep black bars. In my bird it is neither one thing nor the other, the whole of the under surface being grey, profusely, but regularly, mottled with spots of very dark brown, showing no tendency to bars. There is a good deal of white round the base of the beak, which, together with the legs, is the usual yellow colour. The nail of the beak is half black, half white, but this is nothing unusual in this species. On the 1st of February there was a curious under-sized Sheldrake, dwarfed, it may have been, by some early wound; but it certainly was not more than half as big as some of the grand old males I saw hanging up a few days afterwards. About this time there were a great many Goosanders and Smews, many of them splendid old males, but very few Mergansers. I do not think all these Smews were of Dutch origin, as I heard of a good many being killed in England. On February 3rd a Blue Thrush (*Petrocincla cyanea*), turned up; it was a male, and is now in the possession of Mr. Brazener, of Brighton. On the 16th I spied out, among the Capercaillies, a male hybrid between this species and the Black Grouse. It was smaller than a Capercaillie, had a black beak, plum-coloured breast, and a tail which in shape was intermediate between the males of the two species.—J. H. GURNEY, JUN. (Northrepps, Norwich).

WILDFOWL IN CO. WATERFORD.—During the frost of January, and up to the end of that month, numerous flocks of the White-fronted Goose (*Anser albifrons*) frequented this part of the country, both near the coast and inland, settling in the open fields. One that passed into my hands measured $28\frac{1}{2}$ inches from tip of bill to tip of tail, and weighed $5\frac{1}{4}$ lbs. Another, as stated to me, measured $29\frac{3}{4}$ inches from bill to tail. The following birds have also been obtained in this neighbourhood:—A Goosander (eight seen), Shovellers, Tufted Ducks, Sheldrake, Pochards, Great Crested Grebe (immature). Sheldrakes breed in Dungarvon Bay,

and Pochards are not uncommon, but the other birds are rarities here.—
 RICHARD J. USSHER (Cappagh, Cappoquin).

BREEDING RANGE OF THE SNOW BUNTING.—After reading Professor Newton's and Mr. Cordeaux's comments (pp. 103, 104) on my note on the nesting of the Snow Bunting, I cannot doubt that I mistook the Snow Finch for the Snow Bunting. I am perfectly well acquainted with the Snow Bunting, having not only shot them in hard winters on this coast, but having had abundant opportunity of observing both sexes in confinement. Assuming, however, that there is a general resemblance between this species and *Montifringilla nivalis*, as Mr. Cordeaux says, and sufficiently so to invite comparison between the bill and hind claws, I have no doubt I mistook a species tolerably familiar to me for another, the existence of which I did not even know of. One of the birds that I saw appeared very much whiter than the other, and this I took to be the male.—W. OXENDEN HAMMOND (St. Alban's Court, near Wingham).

SABINE'S SNIPE IN HAMPSHIRE.—So many specimens of the so-called Sabine's Snipe have been procured of late years that it has ceased to be the rarity it was at one time supposed to be. Moreover, it is now generally regarded by ornithologists as merely a dark variety, tending towards melanism, of the Common Snipe. I have lately seen a specimen which was shot on the last day of July, 1880, by the Hon. W. Palmer, a son of Lord Selborne, at Wolmer Pond, Hants. This was a young bird, and less dark than usual in its coloration.—J. E. HARTING.

AN ALBINO WHITE-TAILED EAGLE.—I have procured a specimen of the White-tailed Eagle (*Haliaëtus albicilla*), in accidental or albino plumage, bluish white, similar to the Herring Gull. A pair of them were seen, and this one shot. I sent it to the naturalist for the Edinburgh Museum for preservation, and it is now in my possession. While in Edinburgh it was exhibited at a meeting of the Royal Physical Society on the 9th November, and a note was sent me to the effect that only one other bird in this plumage is in Scotland. This is in the Dunrobin Museum, and was shot in Sutherland.—J. T. GARRIOCK (Prospect House, Lerwick).

EIDER DUCK IN SUSSEX.—Referring to Mr. Langton's note in 'The Zoologist' for February (page 63), I may state that three specimens of the Eider Duck, killed on the Sussex coast since the publication of 'Ornithological Rambles,' have come under my notice. One in my own collection was obtained at Selsey in December, 1858. On December 18th, 1867, I saw one which had just been killed at Wittering. The third was killed by a Bosham gunner in the harbour on December 11th, 1872: he called it a "black duck," which is a name usually applied in this part to the Scoters.—WILLIAM JEFFERY (Ratham, Chichester).

APPEARANCE OF THE BLACKCAP IN MARCH.—On the morning of March 8th I saw a female Blackcap Warbler in my garden at Weston, Herts. As I was able to get within three paces of her, and the light was good, I identified her with certainty. This early appearance, after such severe weather is exceptionally difficult to account for.—M. R. PRYOR (Weston Manor, Stevenage).

SHORE LARK NEAR SCARBOROUGH.—On January 15th I shot a male specimen of the Shore Lark (*Alauda alpestris*), about a mile to the north of Scarborough. It is in almost mature plumage, having the black on the head interspersed with a few brown feathers. It was in company with two other Larks, but I could not be sure if they were of the same species.—R. P. HARPER (2, Royal Crescent, Scarborough).

OCCURRENCE OF THE DESERT WHEATEAR IN SCOTLAND.—From a paper by Mr. J. J. Dalglish, read before the Royal Physical Society of Edinburgh on the 19th January last (Proc. Roy. Phys. Soc. Edin., vol. vi., p. 64), it appears that a specimen of the Desert Wheatear (*Saxicola deserti*, Rüppell), was killed on the 26th November, 1880, near Alloa, in Clackmannanshire. The specimen having been forwarded to Mr. Dalglish, he compared it with skins from Egypt and India, and satisfied himself as to the identity of the species. This is the second addition to the *Saxicola* on the British list within a recent period, a specimen of the Russet Wheatear (*S. rufa*, Brisson), having been obtained for the first time in England at Bury, Lancashire, on the 8th May, 1875, as recorded in the Proc. Zool. Soc., 1878, pp. 881, 977.—J. E. HARTING.

ERRATA.—Page 48, line 12, for "Hoopoe," read "Hooper." Page 103, line 29, for "stems," read "stones."

DOES THE FLYING-FISH FLY?—From my own observations on species of *Exocoetus*, made during a voyage to the Cape of Good Hope in 1860, and on the return voyage to England in the following year, I should answer this question in the negative. Having read Mr. Whitman's statements in 'The Zoologist' for November last, and the observations of Mr. Moseley and Capt. Hadfield in subsequent numbers, I was induced to refer to the notes I made after frequent careful observations. The conclusion I arrived at was that the Flying-fish has no real power of flight, nor can it guide its course when in the air. Those I saw invariably rose from the sea *against* the wind, generally skimming low over the water for about fifty yards, when they plunged head-foremost into it. Sometimes, however, their aerial course was more prolonged, perhaps from one to two hundred yards. They were carried forward with great velocity by the initial spring they made from the water, but frequently the wind would drive them round, and if the vessel

happened to be in the way they came on board. I repeatedly saw them bend their bodies till the lower lobes of their caudal fins touched the water, by which means they were enabled to renew their course through the air, and to change its direction. They did not rise so much, nor go so far in the air at a stretch, in calm weather as they did in rough. Although I often noticed a quivering motion of the pectoral fins, I did not observe any regular flapping strokes in the air, such as a bat or bird gives with its wings. A shoal of Flying-fish rising from the sea always reminded me of a flock of Sandpipers or small Plovers, their white bellies flashing in the sunshine, and it is difficult for a casual observer to realise that these fishes are not really flying. If, however, they are carefully watched, it will soon be apparent that the long pectoral fins act merely as a parachute or kite does. It is not often that one is close enough to see the fish when actually leaving the water, but my impression is that the initial impetus is given by the action of the caudal fin and the hinder portion of the body.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

THE FLYING-FISH.—It is remarkable that there should still be any doubt as to the facts in connection with the flight of the Flying-fish. Dr. Günther ('Study of Fishes,' p. 622), summarising the observation of Möbius, says that "they frequently overtop each wave, being carried over it by the pressure of the disturbed air" (in the open sea!). Again, Flying-fishes "never" fall on board vessels "during a calm or from the lee side." At night, "when they are unable to see, they frequently fly against the weather-board, when they are caught by the current of air and carried upwards to a height of twenty feet above the surface of the water." Surely the fish going at the rate of at least ten miles an hour would, on striking the "weather-board," be dashed, bruised and helpless, back into the water instead of coming over the side fresh and vigorous, flapping about on the deck. Except when "by a stroke of its tail" it turns towards the right or left, Möbius concludes that "any deflection from a straight course is due to external circumstances, and not to voluntary action on the part of the fish." I have watched Flying-fish repeatedly, and have invariably seen them fly, or rather glide, over the surface of the sea, and from one to two feet above it, rising gently to the swell when there was no wind, and occasionally turning to the right or left without touching the water. I do not say that when there is a breeze the tail of the fish may not touch it, but I think that, with the foam and spray of the broken water, it would be very difficult to be sure of it, and, moreover, if the tail was used the motion would be a jerking one. Mr. Wallace speaks of their "rising and falling in the most graceful manner," which, although he is referring to another species, applies also to the North Atlantic form (*Exocoetus evolvans*). Mr. Bennett ('Gatherings,' &c., p. 14), says that they "spring from the sea to a great

elevation." This is probably in reference to their coming on board ship at night, attracted, it is supposed, by the lights. I believe the pectoral fins are kept extended without any motion, except perhaps as Mr Whitman, a recent observer, says, just when they rise from the sea. He gives 800 to 1200 feet as the greatest distance he has seen them fly, and about forty seconds as the longest time out of the water. By what mechanical means they move when out of the water is still to me a mystery. I have never known the Flying-fish to be pursued by other fish, nor ever seen any bird near them; indeed few birds are ever seen far from the land north of the southern tropic, where Flying-fish are most abundant. The Dolphin (*Coryphæna*) is supposed to be their greatest enemy. I had once an opportunity of seeing one opened—in the West Indies; its stomach was quite full of *Orthogoriscus mola*, very young, being not quite an inch long.—FRANCIS P. PASCOE (1, Burlington Road, W.)—‘*Nature*,’ Feb. 3.

MEMOIR OF THE LATE EDWARD R. ALSTON, F.L.S.

IN London, on March 7th, of acute phthisis, died EDWARD RICHARD ALSTON, of Stockbriggs, Lesmahagow, Lanarkshire, at the comparatively early age of thirty-five. To say that his death has called forth a universal expression of regret amongst those who knew him is only to announce the feeling of a host of friends; a feeling which, we doubt not, will be shared by very many readers of this Journal to whom his name will be familiar, even if they could not claim a personal acquaintance with him.

Like many another naturalist who has preceded him, and who has made his mark upon the age, Edward Alston's earliest publications appeared in the pages of ‘*The Zoologist*,’ to which periodical for some years he was a frequent contributor. Amongst the articles which will be fresh in the recollection of our readers may be mentioned his “Notes on the Quadrupeds and Birds of Lanarkshire” (Zool. 1865, ’66, ’67), “On the Wild Cattle of Cadzow” (Id. 1865), “Zoological Notes from Arran” (Id. 1866), “On the Habits of the Roe-deer (Id. 1867), “The Folk-lore of Zoology” (Id. 1867-8), “Wayside Notes in France and Germany” (Id. 1868), and “Observations on British Martens” (Id. 1879).

After a year or two spent in travel, during which time, in company with his friend Mr. Harvie Brown, he visited Norway, and Archangel, exploring the country lying at the mouth of the Dwina, of which they gave a most interesting account in ‘*The*

Ibis' for 1873, he settled down in London, and devoted his leisure hours to Zoology, attending the lectures at the Royal College of Surgeons, and visiting the Prosector's studio at the Zoological Society's Gardens, where, with the assistance of the late Prof. Garrod, and of his successor Mr. W. A. Forbes, he made much progress in the study of comparative anatomy.

It was about this time (1873) that he began to work earnestly at a study of the Mammalia, combining research into the literature of the subject with an examination not merely of the external form of museum specimens, but of the osteology and internal structure whenever opportunity presented itself. In this year he undertook the difficult duty of recorder for 'The Zoological Record' of the class *Mammalia*, a duty which he discharged with efficiency until the close of the year 1878, when he was succeeded by Mr. W. A. Forbes.

Elected a Fellow of the Zoological Society in 1869, his first contribution to the 'Proceedings' of that Society appeared in 1874, in the shape of remarks "On a new species of *Pteropus* from Samoa;" and in the same year, in conjunction with Dr. H. Blackmore, he communicated a valuable paper on Fossil *Arvicolidæ*. These were succeeded by the following:—"On *Anomalurus*, its structure and position" (Proc. Zool. Soc. 1875); "On the Murine Dormouse, *Graphiurus murinus*" (1875); "On the classification of the Order *Glires*" (1876); "On the genus *Dasyprocta*" (1876); "On two new species of *Hesperomys*" (1876); "On the Rodents and Marsupials of Duke of York Island and New Britain" (1877); "On an undescribed Shrew from Central America" (1877); "On the Mammals of Asia Minor" (1877); "On the Dentition of *Cuscus*" (1878); "On *Synaptomys Cooperi*" (1878); "On the Squirrels of the Neotropical Region" (1878); "On female Deer with Antlers" (1879); "On the specific identity of the British *Martens*" (1879); "On *Acanthomys leucopus* of Gray" (1879); "On Burmese and Afghan Mammals" (1879); "On a skull of *Tapirus dowi*" (1879); "On a four-horned Chamois" (1879); "On *Tapirus dowi* and *Antechinomys lanigera*" (1880); "On *Antechinomys* and its allies" (1880).

Of his contributions to Scottish periodicals we have no complete list, but we cannot pass unnoticed his 'Catalogue of the Mammals and Reptiles of Sutherlandshire,' revised and issued in pamphlet form in 1875, and his 'Catalogue of Scottish Mammals,'

undertaken at the request of the Natural History Society of Glasgow for a projected "Fauna of Scotland," and published in January, 1880.

Side by side with these productions other excellent work was in progress. In 1874 appeared the second edition of Bell's 'British Quadrupeds,' a considerable portion of which was revised by Mr. Alston, whose name appears as coadjutor on the title-page; and in 1879 he commenced his account of the Mammals of Mexico and Central America for Messrs. Godman and Salvin's 'Biologia Centrali Americana,' which, fortunately for zoologists, he had just completed at the time of his death. This valuable contribution to science, extending over 200 quarto pages, may be regarded as his most important work—a work which, if he had published nothing else, would alone have entitled him to a place in the front rank of scientific naturalists.

But it is not only as a loss to zoological science that the untimely death of Edward Alston will be regretted; he will be remembered by those who knew him best for his generous open-hearted disposition, his honest straightforward character, and his private worth as a friend.

At the time of his death he held the post of Zoological Secretary to the Linnean Society, of which learned body he was elected a Fellow in 1876.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

February 3, 1881.—ROBERT M'LACHLAN, Esq., F.R.S., in the chair.
Lieut.-Col. A. A. Davidson (Madras) was elected a Fellow.

Dried specimens of a Worm and of a Fresh-water Mussel, in which the soft tissues were preserved intact by a new method adopted by Prof. C. Semper, were exhibited on behalf of Herr L. Würth, of Wurzburg.

Mr. A. D. Michael read a communication, "Observations on the Life-History of *Gamasina*." In this the author endeavoured to decide some of the disputed and knotty points in reference to these humble parasites, M. Megnin, of Versailles, and Dr. Kramer, of Schleusingen, both good authorities on the subject, being at variance thereon. Mr. Michael, believing that detached observations on captured specimens may have produced unreliable results, has himself bred Gamasids, closely followed their changes and growth, and watched their manners, and thus has

arrived at what, on good grounds, he assumes to be important results respecting their life-history. He states that the remarkable power of darting each mandible separately with speed and accuracy of aim far in advance of the body, the powerful retractile muscles attached to these mandibles, the organization of the remainder of the mouth, the extreme swiftness of the creatures, the use of the front legs as tactile organs only, and not for the purposes of locomotion, and the ample supply of tactile hairs in front only, seem to fit the animals for a predatory life, and point to habits similar to those of *Cheyletus* and *Trombidium*, rather than to those of the true vegetable feeders, such as the *Oribatidæ* and *Tetramachi*. He further concludes:—(1) That Megnin is correct in saying *Gamasus coleoptratorum*, and other allied creatures, with the conspicuously divided dorsal plates, are not species at all, but immature stages of other species. (2) That the division of the dorsal plate is, in most cases at all events, a question of degree, and does not form a sound basis for classification, as applied by Koch, Kramer, and others. (3) That the dorsal plates do not grow gradually, but alter in size, shape, or development at the ecdysis. (4) That Megnin is right in saying that the characteristic of the so-called *G. marginatus* is simply a provision possessed by the females of a large number of species. (5) That the extent of the white margin depends upon the extent to which the abdomen is distended by eggs. (6) That Megnin is in error in saying that *coleoptratorum* is the nymph of *crassipes*. The nymph of *crassipes* does not show any divided dorsal plates which can be seen on the living creature. (7) That in the species which I have bred there is not any inert stage before the transformation or ecdysis. (8) That in the same species it is the adult female, and not the immature one, as Megnin contends, which breeds.

February 17, 1881.—FRANK CRISP, Esq., LL.B., F.L.S., in the chair.

Mr. A. Hammond exhibited a specimen under the microscope, along with a drawing of a portion of the wall, of the so called glandular sac of the larva of the Puss Moth, *Cerura vinula*, from which that insect is said to eject an acid liquid when alarmed or irritated. He stated that although there could be no doubt that the organ was the source of the excretion in question, there nevertheless was some difficulty in regarding it as a true glandular structure from the large quantity of chitinous matter constituting the wall of the sac itself.

Dr. Francis Day read a paper "Observations on some British Fishes." He pointed out that *Pimelepterus cornubiensis*, Cornish, is identical with the American *Pammelas perciformis*, Mitchell; that great confusion exists in the works of Yarrell and Couch respecting the Tunnies and their allies, most if not all the examples of the Short-finned Tunnies being in reality specimens of *Pelamys sarda*; that the Comber Wrasse (*Labrus Donovanii*,

Cuv. & Val.) is a peculiarly coloured variety of *L. maculatus*, Bloch; that *Crenilabrus Baillonii*, Couch, is *C. melops*, Cuv. & Val. Adult examples of Brill and Sole were exhibited, coloured on both sides, but in which the eyes were normal. Some Sprats were adverted to which had fully-developed ova in January this year, having been obtained off St. Ives. Dr. Day adduced evidence that the specimen of *Ostracion quadricornis* figured by Couch, had not been captured on the British coast near Mevagissey, as reported, but had been brought in salt by a sailor from a warmer climate. Some observations were also made by the author on the habits of the Thresher Shark in relation to Whales.

Prof. P. Martin Duncan read a paper on some Sponges obtained among a mass of fistulose Coral from deep water (1095 fathoms) off the south coast of Spain, during the dredging expedition of H.M.S. 'Porcupine.' One of the Sponges, apparently characteristically new, is described as a species of *Leiodermatium*, *L. affine*, and another belongs to the genus *Aphrocallistes*.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

February 1, 1880.—Prof. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. F. M. Balfour read a paper on the evolution of the placenta, and made some observations on the possibility of employing the characters of this organ in the classification of the Mammals.

Mr. Selater read notes on some Birds collected by Mr. E. F. im-Thurn in British Guiana, amongst which was an example of a new species of *Agelaius*, proposed to be called *A. im-Thurni*, after its discoverer.

Mr. W. T. Blanford read an account of a collection of Reptiles and Frogs made at Singapore by Dr. W. B. Dennys. In this collection were two new species of Ophidians, which were named respectively *Cylindrophis lineatus* and *Simotes Dennysi*, and two new Frogs, which the author proposed to call *Rana laticeps* and *Rhacophorus Dennysi*.

Mr. A. D. Bartlett read an account of a peculiar habit of the Darter, *Plotus anhinga*, in casting up parts of the epithelial lining of the stomach, as observed by him in the specimen now living in the Society's collection.

A communication was read from Mr. A. Heneage Cocks, containing notes on the breeding of Otters, as observed by him in specimens living in his possession.

The Secretary read a paper by the late Mr. Arthur O'Shaughnessy, containing an account of a large collection of Lizards made by Mr. C. Buckley in Ecuador. The collection was stated to be of great interest, both on account of the number of new species it contained and the fresh material it afforded for the study of species already known. Mr. O'Shaughnessy had

given last year a partial notice of this collection, confined, however, to a preliminary list of the species of *Anolis* identified. The present paper gave the results of a study of the whole collection, and was not restricted to the description of the new forms, but enumerated all the species, for the purpose of recording additional remarks and revisions which appeared necessary. In it twenty-seven species were mentioned, ten of which were new.

Mr. G. A. Boulenger read an account of a new species of *Enyalius* in the Brussels Museum, from Ecuador, which he proposed to name *Enyalius O'Shaughnessyi*.

Lieut.-Col. H. H. Godwin-Austen read the first part of a memoir on the Land Shells collected on the island of Socotra by Prof. I. B. Balfour. The present communication comprised an account of the species of *Cyclostomacea* found on the island.

February 15, 1881.—Prof W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January, 1881, and called special attention to a White-nosed Saki, *Pithesia albinasa*, purchased Jan. 11th; an American Monkey of the genus *Callithrix* (probably referable to *C. brunnea*), purchased along with the preceding; and an example of an Insectivore of the genus *Tupaia* (probably *T. tana*), obtained by purchase on the same day.

Mr. Sclater exhibited and made remarks on some eggs of *Opisthocomus cristatus*, obtained at Obydos on the Amazons.

Mr. Howard Saunders, on behalf of Capt. E. A. Butler, exhibited and made remarks on specimens of the eggs of *Dromas ardeola*.

The Rev. O. P. Cambridge exhibited and made remarks on an Hymenopterous parasite, bred from larvæ found on two Spiders—*Linyphia obscura*, Blackw. (female), and *L. zebrina*, Menge (male). The larvæ were stated to be apodous, and to adhere to the abdomen of the Spider, which, when full grown, they fully equalled in size.

Mr. E. W. H. Holdsworth exhibited a specimen of White's Thrush, *Turdus varius*, killed in South Devonshire in January last.

Mr. C. O. Waterhouse read a paper on the Coleopterous Insects belonging to the family *Hispidæ*, collected by Mr. Buckley in Ecuador. Seventeen species of *Hispidæ* had hitherto been recorded as inhabiting that country; of these Mr. Buckley had met with fifteen, which, together with nineteen new species, made a total of thirty-six species in the series now described.

Mr. W. L. Distant read a paper on some additions which had been lately made to the Rhynchotal Fauna of the Ethiopian Region, nine new species belonging to the families *Pentatomidæ*, *Coreidæ* and *Pyrrhocoridæ* were pointed out, and in the *Coreidæ* two new genera, allied to *Petillia* and

Petascelis, were described. The specimens had been obtained from Western, Southern, and Eastern Africa.

A communication was read from Mr. Edgar A. Smith on some shells from Lakes Tanganyika and Nyassa, and from other localities in East Africa, lately received by the British Museum. Great interest attached to some of the shells from Lake Tanganyika, from the fact that they had all the appearance of being modified marine types.

Lord Walsingham read a paper on some new and little-known species of North American *Tineidæ*, amongst which were three new generic forms.—
P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 2, 1881.—H. T. STAINTON, Esq., F.R.S., &c., President, in the chair.

The President made some prefatory remarks, thanking the Society for electing him to that office. He nominated Sir John Lubbock, Bart., Mr. R. Meldola, and Mr. W. L. Distant as Vice-Presidents for the ensuing year.

Mr. Alfred Lloyd, F.C.S. (Dome House, Upper Bognor), and Mr. Theodore Wood (5, Selwyn Terrace, Jasper Road, Upper Norwood), were balloted for and elected Ordinary Members of the Society.

Mr. O. Salvin exhibited two large boxes of Insects of all Orders, collected on the Altos and Pacific coast of Guatemala by Mr. Champion. These had but just arrived, and had not yet been critically examined.

Mr. W. A. Forbes exhibited a curious filamentous growth upon a leaf from New Britain, due to the presence of one of the *Coccidæ*; also the larva of one of the *Blattidæ* from Pernambuco, North Brazil, which was remarkable for its superficial resemblance to an Isopod crustacean. These larvæ were common under the bark of trees in damp woods.

Mr. R. M'Lachlan exhibited two examples of the fungoid parasites of insects. Firstly, a *Sphæria* (*Cordyceps*) attacking a larva from South America, said to be the destructive cotton worm. The larvæ exhibited were certainly coleopterous, and Mr. M'Lachlan considered it probable they belonged to the genus *Dynastes*. Secondly, a moth, one of the *Noctuæ*, from South Wales, attacked by a species of *Isaria*.

Mr. C. O. Waterhouse was inclined to refer the South American larva to the genus *Passalus*, from an examination of the form of the head.

Mr. M'Lachlan also exhibited three males and one female of *Thore concinna*, a beautiful dragon-fly from Ecuador described in his paper read this evening.

Mr. T. R. Billups exhibited two specimens of *Pezomachus distinctus*, a species new to the British fauna, from Mickleham; also a new species of *Stibeutes*, captured at Deal last August.

Mr. F. P. Pascoe exhibited a specimen of *Peripatus Novæ-Zelandiæ* in spirits, and remarked that Sir J. Lubbock, in his recent Address, quoted a German author who asserted that the tracheæ discovered by Moseley were merely modifications of the subcutaneous glands, thus again removing this curious creature from the *Arthropoda* back to the worms (*Vermes*). This was, however, contrary to the opinion of Huxley, Schmarda and other writers. It was stated that *Peripatus* was unsegmented, but Schmarda gives "13 to 36" segments in characterizing the group. Through the kindness of Prof. Jeffrey Bell, he (Mr. Pascoe) had examined the species in the British Museum, and found that *P. Edwardsii* was the only one with any traces of segmentation. It is probable that Schmarda intended that each pair of legs indicated a segment.

Mr. W. L. Distant exhibited a very large *Cicada* received from Madagascar, belonging to the genus *Platypleura*, but at present undescribed.

In reply to the President, as to whether any information was procured as to the amount of sound produced by the musical apparatus of this large *Cicada*, Mr. Distant stated that unfortunately he had no opportunity of learning anything of its habits; but that he might perhaps be permitted to state, whilst on the subject, that though undoubtedly the possession of the sound-giving apparatus was confined to the males, and was thus due to sexual causes and used for sexual purposes, it might still possibly serve some protective function as well.

Mr. W. F. Kirby announced the death of Herr Gabriel Koch, sen., of Frankfurt, on January 22nd, 1881, in the seventy-fourth year of his age. He was best known for his work on the geographical distribution of Lepidoptera.

Mr. R. Meldola read a communication from M. André with reference to some criticisms, made at the October meeting of the Society, on the author's method of publishing the descriptions of new genera and species on the wrapper or on loose sheets of his work now publishing on the Hymenoptera of Europe.

The Secretary read a letter from Mr. George Giles, of Brixton, enclosing a newspaper cutting from an Australian paper detailing the death of a child, in consequence, as was supposed, of the bite of a small spider.

Mr. Arthur G. Butler communicated a paper entitled "Descriptions of new Genera and Species of Heterocerous Lepidoptera from Japan."

Mr. R. M'Lachlan read some "Notes on *Odonata* of the Subfamilies *Corduliina*, *Calopterygina*, and *Agrionina* (Legion *Pseudostigma*), collected by Mr. Buckley in the district of the Rio Bobonaza in Ecuador."

Mr. W. F. Kirby read "A List of the Hymenoptera of New Zealand," in which eighty-two species were enumerated, including five described as new.

Mr. Joseph S. Baly communicated a paper entitled "Descriptions of new species of *Galerucidæ*."—E. A. FITCH, *Hon. Secretary*.

NOTICES OF NEW BOOKS.

A List of European Birds, including all Species found in the Western Palæarctic Region. The Nomenclature carefully revised by HENRY E. DRESSER, F.L.S., F.Z.S., &c. 8vo, pp. 40. London: published by the Author at 6, Tenterden Street, Hanover Square. 1881.

WE rejoice to see that Mr. Dresser has completed his labours in writing a 'History of the Birds of Europe' by publishing a convenient list of the species described and figured in that work. Regarding the form in which the list is presented, it is impossible for the critic to be otherwise than complimentary; the pamphlet is of a handy size, and the typography and paper are alike excellent. The plan of leaving the right half of each page blank makes the list equally available for labels and for notes.

The first thing that will strike the majority of readers will no doubt be the novelty of the systematic arrangement. When such a step in scientific advancement as Mr. Dresser has here made is taken in a popular work, it behoves a reviewer to ignore captious criticism, and to devote his allotted space to help in making clear the reasons for such a radical innovation.

Now it is unfortunate that Mr. Dresser states in his Introduction that he has followed Professor Huxley's classification; he has indeed followed his principles, but we doubt whether Professor Huxley would, without this remark, have been at once struck with their paternity. The history of the matter is somewhat in this wise. In April, 1867, Prof. Huxley read a paper before the Zoological Society of London "On the Classification of Birds; and on the Taxonomic Value of the Modifications of certain of the Cranial Bones observable in that Class." Some of his conclusions were modified subsequently (P. Z. S., May 14, 1868), and Prof. Parker has suggested further modifications which more extended research has shown to be necessary; but the main points of the revolution he inaugurated remain to this day unimpugned. Ornithologists—at least those who are mainly concerned in observing the phases of bird-life, apart from comparative zoological considerations—have been slow to take in the value of Prof. Huxley's conclusions, and Messrs. Selater and Salvin

seem to be the only authors who have given them the benefit of a practical application. In their 'Nomenclator Avium Neotropicalium' a modification of the new classification is adopted, which Mr. Slater has done much to popularise in each successive edition of the 'List of Vertebrates now or lately living in the Gardens of the Zoological Society of London.' But it is to be noticed that the new nomenclature proposed by Prof. Huxley is, by all his followers, rejected. It is found more convenient in practice to use the name *Passeres* than, out of simple regard for uniformity, *Coracomorphæ*; the name *Columbæ* has a familiar ring that its Huxleyan equivalent *Peristeromorphæ* can never reach; and the credit of giving popular currency and scientific limitation to old names is due, not to Prof. Huxley, but to Mr. Slater. One obvious advantage of the new method is that, in place of the old six or seven unwieldy "orders" of European birds, we have, in Mr. Dresser's List, no less than sixteen orders, and the familiar names go far to simplify the comprehension of the new system. Anatomists seem pretty well agreed that Prof. Huxley's classification of birds is the best that has yet been proposed, but ornithologists who follow him ought, in common fairness, to be careful to acknowledge that it is his principles rather than his practice that they adopt.

Now Prof. Huxley subdivides all species of birds that exist at the present day into (1) those that have a keeled sternum, which gives attachment to the muscles that act upon the wings, and (2) those that have no keel developed on the sternum at all; the one group he calls *Carinatae* (from *carina*, a keel), the other *Ratitæ* (from *ratis*, a raft). This he does on the principles of the theory of Evolution, taking for granted that all birds had a common ancestor; that some groups had no necessity for the use of wings, therefore muscles to move them became, in course of time, an impediment rather than an assistance; while others could only support existence by emphasising the faculty of flight. In Europe we are only concerned with the *Carinatae*. These Prof. Huxley divides according to peculiarities in the construction of their skulls; and he takes such a point because it can only be in the most remote degree referable to the individual bird's manner of life; it is not a character which can ever have had its origin in external circumstances; it must have arisen from genetic divergences. He finds that one group of birds has the

maxillo-palatine bones united (*Desmognathæ*); in the other groups—and by this means he gets another perfect dichotomy, a positive class and a negative class—the maxillo-palatines are free and separate. But, unfortunately for systematists, this latter class contains by far the greater number of species, so that a further subdivision becomes necessary. The formation of the vomer, or ploughshare-bone of the palate, affords here definite characteristics; one group has the vomer pointed in front (*Schizognathæ*), the other has it truncated, or cut off nearly square (*Egithognathæ*).

All this while we must bear in mind that the whole classification is, or aims at being, simply the formation of a family-tree. We do not know what the primitive bird was, but we regard it as the trunk of the tree. After a time the birds which used wings diverged from those which did not; whereby we get two branches. One of these branches was stunted, but it bore strange Ostriches and Cassowaries, and such like, which do not concern us here. The other was imbued with a vigorous life. In one direction it bore *Desmognathous* birds—birds of prey, Cuckoos, Ducks, Herons, and Penguins; each grew out to bear twigs and sprays and leaves innumerable; all successively divergent, but all tracing their descent from one particular branch. In another it bore birds which so soon emphasised their peculiarities that the great boughs bearing *Schizognathous* and *Egithognathous* birds grew so strong as to form features comparable to the whole of the *Desmognathous* ones taken together. Every fresh divergence sought air and space for fresh change, and now at the present day we must not compare adjacent leaves in the periphery of our family-tree, but must seek, through all their obvious semblance, the branch from which they severally spring. The leaves all point to different spots in the heavens, and we cannot scientifically arrange them in any linear order. One belongs to this family and another to that, and when we have to print their names in order, page after page, we must not expect the first of one group to bear any necessary relation to the last of its predecessor; it is the group, not the individual, which we must compare. Regarded in this light we no longer see any absurdity in ranging the Smew next the Ring-Dove, for example; one springs from a totally different branch from the other. And while we must congratulate Mr. Dresser on his great endeavours,

we can well forgive him his peculiarities; we might easily complain of his subdivision of the *Passeres*, but we dare not, at a moment's notice (if we could after a life-long study), propose a better.

A List of British Birds, with, as an Appendix, the "Graduated List" for labelling Eggs. Compiled by HERBERT W. MARSDEN. 35 pp. Gloucester: H. W. Marsden. 1881.

It is difficult to perceive the exact purpose which the present publication, of which the name sufficiently indicates the nature, is intended to fulfil. Of dealers' lists the name is legion. All are more or less founded on the last completed edition of Yarrell's 'History of British Birds.' Mr. Marsden has copied his predecessors in little else than their antiquated system of classification; nine times out of ten he has followed the nomenclature adopted by Mr. H. T. Wharton in his 'List of British Birds,' which was reviewed in these columns four years ago ('Zoologist,' 1877, pp. 458 *seq.*). Not that we blame him for taking one of the latest authorities for his model; but that he does so somewhat blindly is copiously illustrated by his divergences. For instance, *Haliaeetus* (No. 5) can only be spelt *Haliaëtus* rightly; Prof. Newton (Yarrell, ed. 4, vol. i., p. 333) has shown that the specific name of the Black Redstart should be *titys*, not *tithys* (No. 67); "*Sylvia undatus*" (No. 81) is an amusing instance of the necessity for circumspection in changing a generic name; and *Actitis hypoleucos* (No. 245), *Tringa subarcuata* (No. 249), *Tringa temminckii*, *Xema sabini*, &c., seem very like cases of sinning against light. After Mr. Howard Saunders's exhaustive elucidation of the synonymy of the *Laridæ*, it is grievous to see *Rhodostethia rossi* (Richardson, 1825) still given (No. 384) as the name of *R. rosea* (Macgillivray, 1824); and the appellations of Richardson's and Buffon's Skuas thrown back into the confusion of incorrect nomenclature. If Mr. Marsden disagrees with recent lists, he should at least regard the conclusions of the latest monographers; when he fails to do this latter, it is perhaps not surprising that he should come to some strange results regarding the generic titles of the *Strigidæ*. Ornithologists are not unanimous, it is true, in accepting Professor Newton's interpretation of the Stricklandian Code in this matter; but he who follows him in calling the Barn Owl *Aluco flammeus* (No. 37) is

scarcely justified in calling the "Sparrow Owl" *Strix passerina* (No. 34), whatever he may mean by the name.

While we cannot but disagree with Mr. Marsden on such points as these, we must commend his intention of marking each species not truly British with an indication of its national home. Now that observers are so numerous, it is important that species accredited to the British Fauna should not permanently take their place there without a *caveat* respecting their alien origin. However, Mr. Marsden's additions to the list of birds generally reputed British seem rather arbitrarily chosen. For example, the Red-eyed Flycatcher's occurrence in Britain rests on very different evidence than does that of the Russet Wheatear or the Barred Warbler; there seems to be no presumption of the former having been found wild in Europe. And as to the Rufous Swallow, Mr. Dresser has shown, in part 37 of his 'Birds of Europe,' that the record of its having appeared in Britain is due to a mistake in identification; yet, if it be admitted, it should be called *Hirundo savignii* of Stephens, 1817, not, as Mr. Marsden has it (No. 189), *Hirundo cahirica* of Lichtenstein, 1823.

Whether a new List of British Birds was wanted at all just now, when it is known that the British Ornithologists' Union has appointed a Committee to draw up one that, it may be presumed, will carry considerable authority, is perhaps merely a question of trade convenience; but it can hardly be gainsaid that a "Graduated List" such as Mr. Marsden furnishes us with on the last ten pages of his pamphlet cannot have any "*raison d'être*" whatever. It is professedly compiled for use in labelling eggs; but nowadays no egg-collector is content with anything short of actual writing on any specimens for whose identity he wishes to vouch. To gum a label on to an egg is to expose the specimen to serious disadvantages; the gum may be inefficient, and the label may consequently be lost; while, if the label do adhere, and it be at any time expedient to remove it, the chances are considerable that the label will remove a portion of the egg-shell along with it.

As a mercantile speculation, Mr. Marsden's List may meet with success; but it is rather hard that inexperienced ornithologists should be imbued by it with incorrect notions both of science and of practice.

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[No. 53.

THE PAST AND PRESENT DISTRIBUTION OF SOME OF THE RARER ANIMALS OF SCOTLAND.*

By J. A. HARVIE-BROWN, F.Z.S.

III. THE POLECAT.

THE same causes which have influenced the decrease of the Marten seem to have operated in the case of the Polecat. Rabbit-trapping has proved fatal to it; for, whilst the increase of rabbits has provided it with an abundant supply of food, it has been the indirect means (through the agency of steel-traps) of causing its decrease.

Inland localities in the Highlands comparatively unstocked with rabbits have been gradually deserted by Polecats, which, drawing down towards the sandy barrens along shore where rabbits abounded, became an easy prey. Man, in order to rid himself of the "ubiquitous bunny," for sport or profit, set to work to devise means for its destruction. Steel-traps came generally into use, and the rapid disappearance of the Polecat was the result. The animal still exists, however, in some numbers in sea-shore localities; but careful inquiries have elicited the fact that this is only the case where rabbits do *not* abound, and are *not* systematically trapped, and where Polecats consequently are obliged to subsist on other kinds of food. It is amongst rugged deeply-indented shore-lines, where the area to be covered by vermin-trappers is greater than can be easily undertaken, that they are chiefly to be met with. In other words, these coast-lines afford the same means of replenishing the stock

* Continued from p. 90.

of Polecats as the deer-forests do in replenishing and saving from extinction the Wild Cat and the Marten. Some years ago one might have said, "You will find the Polecat most plentiful amongst the 'links,' or sandy downs, where they go to live on the rabbits." Of late years one would say, "Polecats have become very scarce, *especially amongst the sandy downs.*"*

No returns from any of the following counties having reached me, I should be obliged to anyone who will assist me to fill up these blanks:—Selkirk, Peebles, Lanark, Rosshire, Cromarty, and Caithness. I should be grateful also for any further statistics not contained in the following notes, as well as for any correction of errors.

Berwickshire.—In this county, as indeed generally throughout the south of Scotland, the Polecat was very abundant. They frequented the Peasedean Woods in considerable numbers, but Mr. Hardy informs me that he has not seen one "nailed up" for a long time. When I was at Grants-House, in July, 1880, the driver who took me over to Abbey St. Bathans, where I was going to fish the Whitadder, told me that he remembered one being killed there several years ago, but could not recollect the exact date. Mr. J. Hardy has kindly sent me the following data from Berwickshire:—"One killed near West Morriston forty-five years ago (say 1835). Another killed at Mellerstein House twenty-three years ago (say 1857), now stuffed in the House. One killed near Marchmont long ago (?). One seen at Threeburn Ford, parish of Chamelkirk, four or five years ago (say 1877 or 1876). A "Fou-mart" seen on Edington Braes, on the Whitadder, some thirty years ago (say 1850). Forty years ago (say 1840) there were numbers at Thirlstane Castle. One was seen in the summer of 1880, when my informant was fishing near Linhope on the Breamish (southern base of the Cheviots, Northumberland). One caught by the gamekeeper at Langton, near Dunse, fourteen years ago (say 1866). Not known now in the Gordon district. The last Polecat caught near Chirnside, near Blaneme, parish of Buncle, about forty years ago (say 1840). Once plentiful in Dowlaw Deane, near Fastcastle, and believed to be not yet extirpated. No Polecat

* It is curious, however, that in East Cumberland, where the Marten appears not uncommon, the Polecat seems to be almost exterminated, none having been seen for a number of years, as I am informed by Mr. Parkin.

trapped or killed on the Dunglass Estate (which includes Pease-dean, Oldcambus, Dowlaw, &c.) during the present gamekeeper's time, and he has been in the situation thirty years (say since 1850). My recollection of them goes back to 1830 at least." Could such exact statistics as the above be obtained from every county in Scotland, our history of the Polecat would indeed be very complete.

Roxburgh.—In the same way it has become scarcer in Roxburgh, and people speak of their experiences of the animal as dating pretty far back. Thus Mr. Smail, "many years ago," found an abode of a Polecat in a dyke near the Doorpool Rookery. "It was shaped," he writes, "like a flattish nest in the centre of the old 'dry-stane' wall, the nest or den being made of grass." It contained one young one, but the adults were not to be found. They escaped by moving along the holes in the old wall. At a meeting of the Berwickshire Naturalists' Field Club, in 1880, at Gilsland, Naworth, and Lowercost, Mr. James Hardy discovered the remains (feet and tail) of a Polecat nailed to the door of the Vicarage at Lowercost, in Cumberland. At the time this led to a story by Mr. Turnbull, postmaster at Lilliesleaf, Roxburghshire, of his having seen a Polecat at Riddell, near that place. About twenty-five years ago (say 1855) a number of Polecats were killed near Kelso, but Mr. Brotherstone, of Kelso, seems inclined to put their extinction at an earlier date by five years (say 1850). In 1878 Mr. Turnbull, of Lilliesleaf, saw a Polecat run down and kill a rabbit in a field near Riddell, on the River Ale, at which locality a rabbit-catcher, still alive, informed Mr. Hardy, of Old Cambus, that he used to kill many when a boy. In the Jed Valley it is now not so frequent as formerly, principally owing to the trapping of rabbits. The last seen by my correspondent (Mr. Yair) was got at Langlee, near Jedburgh, about twenty-three years ago (say 1857). In Liddesdale one was caught in the winter of 1879-80.

Dumfries.—At one time the skins were sold at the Dumfries fairs in considerable numbers, but Dr. Grierson has not heard of one being taken for at least fifteen years (say since 1865). There are some fine specimens in his museum at Thornhill, all obtained more than fifteen years ago (say prior to 1865). The last specimen remembered by Sir Alexander Jardine, Bart., as he informed me, was probably about 1840. About 1853, however, Mr. Nichol Kerr,

at that time keeper in that county, considered the Polecat to be not uncommon; he killed one that year.

Kirkcudbright.—The “Foumart” was once a common species in the Stewartry, but Mr. Service is afraid it is now extinct, or practically so. A few may yet remain in the wilder districts. In the eastern part of the Stewartry none have been heard of for a very long time. About thirteen years ago Mr. Lennon witnessed the chase of a hare by a Foumart. Both, when they passed him, appeared to be very much fatigued, the hare, especially, “staggering like a drunken man.” This would be about 1867. Three years before (1864) Mr. Lennon stuffed one which was killed at Mountain Hall, on the Dumfriesshire side of the Nith. These are the last Foumarts Mr. Service can hear of in the vicinity of Dumfries. Mr. Hastings received two from Kirkennan, near Dalbeattie, about eleven years ago, and believes they are all but extinct in the south-west of Scotland, and nearly all accounts agree that “the rapid extinction of the Foumarts has been caused, as already indicated, by rabbit trapping,” although due more to accident than to design on the part of gamekeepers and rabbit-trappers. It is seven years since a Foumart has been seen on Arbigland (Col. Blackett’s), and they are considered to be quite extinct all through the county, except possibly on the high rough country in the north-west. In the parish of Kelton, in central Kirkcudbrightshire, the last Foumarts were seen on the estate of Dildawn about twenty-five years ago (say 1856), when a nest of young ones was destroyed. Mr. Bruce never heard of a Foumart on Slogarie, a circumstance which Mr. Service considers curious, for the ground is rough enough to afford excellent shelter for them. In February, 1881, Mr. Service was informed that a Foumart had been killed in Maryfield of Terregles, the next parish to Troqueer, early in December, 1880, where a valuable breed of ducks belonging to the farmer had been sadly thinned by its depredations, and a trap set in the evening secured the Foumart the next morning, not, however, before it had killed two more ducks. The dead ducks were found to have the brains neatly picked out. Mr. Service adds, “Probably the last of its race hereabouts.”

Ayrshire.—As long ago as 1839, Thompson (‘Fauna of Ireland,’ ed. 1856, vol. iv., p. 9) saw several on the 5th September, which were taken at Ballantrae, in the south of Ayrshire, and in 1841

was credibly informed that these were killed in the neighbourhood of Loch Cor. At Culzean they are considered almost extinct now (1880), though occasionally one is caught by the keepers.

Lanarkshire.—The late Mr. E. R. Alston had not heard of a Polecat in this county for at least twenty years.

Haddingtonshire.—Dr. Crombie, of North Berwick, informs me that the last he heard of was shot about a mile from North Berwick, about twenty years ago (say 1860).

Edinburgh.—In Midlothian the only Polecats of which I have record are—one obtained on the farm of Tala Hill, and one seen some years ago at Crosswood Hill, as I am informed by Mr. Charles Cook. Mr. James Haldane remembers seeing one at Edmonstone, near Liberton, about twenty-five years ago, which was afterwards trapped by the keepers.

Linlithgow.—At Champ-fleurie two Polecats were killed in 1847 by David Carr, and none have been seen there since. The same man killed nine between 1838 and 1845 at Lochcote in the same county.

Stirling and Dumbarton.—In 1877 Mr. James Lumsden recorded the species as “quite extinct now, except by name.” Mr. Colquhoun tells me they were at one time so plentiful that they might be caught at almost any time. He considers that since the reclamation of waste land “Foumarts” have become scarcer; but in this alone, I think, we can hardly look for the cause, for they are becoming scarce even in the deer-forests, and in some localities prefer cultivated to waste lands. Fifty-five years ago (say 1825) Polecats could not have been very common in Stirlingshire, for people even at that time were known to go a considerable distance to see one when obtained. Drummond, who was gamekeeper at Dunipace in my grandfather’s time, occasionally trapped a few. Rabbits are said to have been introduced to the East of Stirlingshire about 1825, or between that time and 1830, by the fox-hunters, to afford food for the foxes. I do not remember hearing of any Polecats being obtained since that time; but an old mole-catcher told me of his having seen several on Gallowmuir about twenty years ago. Mr. Nichol Kerr, at Killearn, says they are extinct in that district of Stirlingshire, and he has not heard of one being killed for the last twenty years. About thirty years ago (say 1850), when the present gamekeeper at Blairdrummond, in the south-west of Perthshire, was keeper at Sauchie,

he trapped a few Polecats, but they were not very abundant. The latest I have record of is one which Mr. James Stirling, of Garden, heard of near that place during the winter of 1879-80.

Kinross.—The earliest record I have for this county refers to one seen at Turfhill by Mr. H. Henderson about thirty-five years ago, say 1845. Even the memory of it has almost died out. Mr. Alexander Michie says, "The last, twenty years ago, on the moss on Scotland-well."

Fife.—Falkland Woods, in Fife, seem to retain conditions favourable to the residence of the Polecat. No doubt, in rocky, rugged, stony ground frequented by rabbits, trappers cannot use their steel-traps with such effect, or so numerous, and thus doubtless many inlets and outlets are left unguarded, by which the Polecat escapes the comparatively few traps which are set, whilst at the same time the food-supply remains abundant. About thirty-five years ago, when the Falkland Woods were inhabited by Polecats, Mr. Gulland remembers seeing one about in the Barn-yard Park at Falkland, which ran the gauntlet amongst a number of reapers and escaped. In 1880 one was often seen in the grounds. "When chased it took refuge in the thick ivy of the palace walls. The keeper tried to trap it, without success." None have been seen for twenty years (say since 1860) by the keeper at Lathirsk. At Lawhill the last Fomart was obtained by the old gamekeeper about fourteen years ago (say 1866). Mr. Charles Harvie, who is my informant in this case, saw a "black one in an old wood on the east sea-coast cliff twenty-four years ago" (say 1856). It is probably extinct long ago in East Fife. Locally termed "foumaret."

Perthshire.—Seems to afford refuge to some of our rarer animals longer than other counties farther south, or equally so, or, it may be, the number of observers is greater, and therefore its Natural History is being more fully worked out. In the south of the county it is, however, very rare. None have been obtained for the past twenty years (say since 1860) in any part of the Allan Valley, between Perth and Stirling. But at Leny, near Callander, one was trapped in 1858, and one previously in 1855. According to Col. Drummond Hay, our best authority for that district, they were common in the Carse of Gowrie about 1820 to 1824, but are now extinct and have been so for many years. At Duplin they have been extinct for at least twenty-five years, say since 1855.

At Doune, Mr. Anderson writes, "In all my trapping experiences I have only captured four. About thirty years ago (say 1850) I caught one on Lord Moray's estate above Doune. On Balquhiddy Mr. W. Dewar killed Polecats twenty-five years ago (say 1855). It was exterminated in Glen Queich, above Cumbree, thirty years ago (say 1850). I have said that the Polecat has long been extinct in the valley of the Allan between Perth and Stirling, but upon the slopes of the Ochils facing the north it has lingered somewhat longer. None have been observed at Cloanden, near Auchterarder since Mr. H. Haldane purchased the property, some twenty-five years ago (say 1855), but at Kincardine, about three miles from Cloanden, one was killed ten years ago (say 1870). This is the last known to have occurred in the district, where formerly it used to be common. At Balquhiddy I have said they were killed about twenty-five years ago, but I have a much more recent date to notice. In 1880 Mr. W. D. Duncan, the lessee of the Edinchip shootings of Sir Malcolm Macgregor, Bart., saw a fine Polecat close upon the March with Suie; and previous to this Mr. John Dickson, co-lessee of the same shootings, shot another about the same place. This was in August, 1880. The gamekeeper at Edinchip, who was previously keeper on Suie, told me afterwards that he had not seen one in that neighbourhood for twelve years (say since 1868). Edinchip is at the head of Loch Earn. About twenty years ago two were trapped in Glen Artney deer-forest, and this informant says, "none have been got hereabouts since then." Farther north one was trapped on Ballechin Hill about thirty years ago, by Mr. Murray, gamekeeper. They inhabited the east side of Drummond Hill in 1835. At Killin Mr. Duncan Dewar got a male and female in 1858, the last obtained around Loch Tay. One of these Mr. Dewar carried home alive in his handkerchief, but it was so offensive that he could not keep it.

Argyllshire.—In this county it is not quite so scarce yet. In the Loch Awe district, however, it has been quite extinct for upwards of twenty years, say since 1860. Farther north, in Sunart and Ardnamurchan it is still not uncommon. As many as fifty have been killed during the past ten years. Two were got in 1880 (about Jan. 20th), in Ardnamurchan, and these probably came in from Sunart (Sir Thomas Riddell's), where a few are usually obtained when trapping rabbits, but none in 1879 or 1880.

Two or three, on an average, are still obtained every year on Ardnamurchan, but they are decidedly scarcer than formerly. In Glenmore only one was killed in two years, *viz.* in 1861.

Forfarshire.—The last Polecat I can hear of in this county is one killed at Oldbar by Mr. Smart, about 1858 or 1859. One was trapped in the Carse of Gowrie in 1849 by James Keddie (*fide* Capt. H. W. Feilden).

Kincardine.—From this county I have few returns, finding a difficulty in obtaining a correspondent on Natural History topics. Mr. Mowat, formerly keeper at Ury, informs me that they were plentiful about 1843, as many as three having been killed by him in a morning, but only one between 1849 and 1853. In 1851 one attacked his ferret and nearly killed it. On an estate adjoining he never heard of one being killed between 1862 and 1869.

Aberdeenshire.—Polecats have long been extinct in the lowland districts of the county and in the north-west. About twenty-seven years ago (say 1853) one was killed in the "kiln-logie" of an old kiln on the farm of Boghead. About 1832 a young lad saw one on the moss of Pitsligo, gave chase to it, drove it into a drain, and succeeded in killing it. About 1834 one played great havoc in the hen-house of Know-Head of Pitsillie: after killing all the ducks it was caught in a trap. Since that time the Rev. W. Grigor, of Pitsligo, has not heard of one in that district. Mr. Sim says it is now extinct around Aberdeen. About fifteen years ago he used to receive a few for preservation, "but now none." The last he had, he writes, "was from Yokies Hill, parish of Mintaw, about ten years ago" (say 1870). In the Don Valley it has been extinct at least twelve years (say since 1868). Before that date Mr. James Robb, keeper at Kildrummy, in Upper Don Valley, used to kill two or three every year. In East Aberdeenshire probably extinct. Not known at Brucklay for the last ten or twelve years (say since 1870 or 1868). Twenty years ago they were numerous at Crathes, on the Dee, twelve miles above Aberdeen, when Mr. Will (now keeper at Keith) was there; he used to kill several in a season: now probably killed out. At Littlewood, on Donside, sixteen years ago (say 1863-64) Mr. Mackie (now keeper at Keith), in two years' trapping, killed upwards of thirty Polecats. He says the best way of trapping them is at a high rock or by the side of an old "dry-stane" dyke which runs over the hill. Build a small "housie" against the rock or dyke,

shut in at each side, but open to the front; put the bait at the back and the trap at the opening; the trap must be roofed in. Of late years, however, in the east of the county it is stated to have reappeared. In an upholsterer's window at Frazerburgh is exhibited a large Polecat shot at Kinnaird Head, near the town, during the winter of 1879-80. It is stated to be extinct now in Braemar, and has not been seen for at least fifteen years (say 1865) in the Old Mar Lodge grounds.

Banff, Moray, and Nairn.—In these counties the Polecat, so far as shown by my returns, appears to be extinct, or nearly so. There used to be a few at Dalry, near Forres (Elgin), but when my informant left, at Christmas, 1876, they had been all killed off. In Darnaway Forest there are now probably none. The brother of the proprietor of Edintore (Banff), Mr. Hay, killed one twelve or thirteen years ago (say 1867-8), but none have been heard of at that place since. The locality is known to me, and was in a bank of whins near Keith. He caught it alive by the neck, like a ferret, carried it home and then killed it. Thomas Edward's encounter with a Polecat in the ruined Castle of Boyne will be remembered by those who have read the 'Life of a Scotch Naturalist,' by Smiles.

Invernesshire.—The abundance of the Polecat in certain parts of Scotland is testified to by certain records, of no very ancient date, left to us. Thus, in the 'Highland Note-Book' of Carruthers, it is noted that no fewer than one hundred and nine Polecats were killed during a war of extermination waged against vermin on the Glengarry shootings during the three years between Whitsuntide, 1837 and 1840. While the Polecat is now rare in the south of the county, and approaching extinction in many parts of it, it is still common in many of the wilder parts, especially in certain districts north of the Caledonian Canal; and it is still to be found in Badenoch, and towards the southwestern extremity of the Canal is still not rare, and is reported as commoner than the Marten. North of the Canal it has become rare in the east. From 1855 to 1865 the Polecat may be said to have been numerous at Guisachan. It is now seldom met with, but in 1878 two were taken, and three the year before; none, however, were seen in 1880. Very few have been found since 1874 on Struy, Beauley. The present head keeper has only killed five. South of the Canal, in Ben Alder Forest,

one Polecat was seen near Lake Errochd Lodge, in 1878. None have been seen in Abernethy and Glenmore for twenty years; in 1860 the last was trapped there. The last obtained on the Bellerich Estate (Mr. C. J. B. MacPherson's) was about seven years ago (say 1873), and the last I have recorded on Glenshero Estate, parish of Laggan, was on October 8th, 1867.

Sutherland.—Mr. T. E. Buckley writes to me as follows regarding this species in the east of the county:—"Polecats used to be very common at one time; but before I came to Sutherland rabbits had increased very much on the coast, and that seems to have attracted all the Polecats around, for although I never got but two skins, and I only heard of two more being got on the Brora shootings, on the next shootings, where rabbits abounded, a very large number were got, especially in one year. After that not one was got, just as if they were all exterminated. The last I got was a small one caught near the house in 1879." This congregating of Polecats occurs along the east coast wherever rabbits are plentiful, and on the west coast also, even where there are few or no rabbits. Thus in Stoir peninsula and the extreme western part of Assynt, Polecats are still not infrequent along-shore, but at more inland localities have long been scarce. Examining several lists of vermin killed in Sutherland, which I have before alluded to, I find that in Assynt and part of Durness, two Polecats were killed in 1870, three in 1871, two in 1872, one in 1873, one in 1874, and one in 1875. All of these were in Assynt and none in Durness. I doubt, however, whether this indicates a scarcity in Durness, but rather the superior skill of the Assynt trapper, though after all but little skill is required. A list of vermin killed on Glendhu shows an increase of late years of those killed between 1866 and 1880. This is partly owing perhaps to protection afforded in the wilder parts of the adjoining deer-forest and in the Reay country, and to Glendhu being now more preserved and more regularly trapped. In 1868, two; in 1872, eight; in 1873, up to May, four; in 1879, from June, two; up to May, 1880, two. A corresponding increase in all vermin killed, however, points to a different system being followed. In the Reay country itself between 1873 and six months of 1879, included, no less than twenty were killed.* On one shooting

* In this list of vermin killed, no less than 368 Water Ouzels are included; but I have suggested to Mr. McIvor that the blood-money should

alone in Assynt one trapper's return shows somewhat interesting material. I reproduce that part of the list which relates to three species,—the Wild Cat, Marten, and Polecat,—all killed by one keeper unaided. These returns show the comparative numbers, productiveness, power of concealment, and to some extent "survival of the fittest in the struggle for existence," against the means used directly by man for their extermination. The table shows the abundance of the Wild Cat and Marten prior to 1874, and their scarcity and sudden decrease thereafter up to 1880; whereas the Polecat, though less abundant, was better concealed, or being confined to the coast-lines for the most part, more easily escaped, and continued not uncommon even down to 1879:—

TABLE showing comparative numbers of three species of indigenous *Carnivora* killed on one Shooting by an experienced Trapper in the twelve years ending 1880.

	Wild Cat.	Marten.	Polecat.		Wild Cat.	Marten.	Polecat.
1869 . .	7	8	2	1875 . .	1	—	1
1870 . .	6	5	1	1876 . .	—	—	4
1871 . .	4	3	2	1877 . .	—	—	2
1872 . .	3	2	1	1878 . .	1	—	1
1873 . .	1	3	—	1879 . .	—	—	1
1874 . .	2	1	—	1880 . .	1	—	—

In the east of the county, on Dunrobin, four Polecats were killed in 1873, and no more are recorded until 1879, when one was obtained. Mr. C. Frazer believes that about thirty Polecats have been killed in the Reay Forest during the past ten years, but he has kept no lists; nor does it appear that any of the foresters and keepers in the Reay country kept any. They sent all their "vermin" direct to the factors.

be taken off their heads and put upon the Hooded Crows, and he has since forbidden the killing of the former birds. They are no longer killed in Assynt, nor do I find any notice of them in any of my other returns of vermin killed. At one time the slaughter of the innocents was general.

SOME ANCIENT RECORDS RELATING TO THE WILD ANIMALS OF NORTHUMBERLAND.

COMMUNICATED BY T. H. NELSON.

THE following extracts, for which I am indebted to Mr. Robert Forster, who is engaged upon a history of Corbridge-on-Tyne, are taken from the Churchwardens' books of that parish, and relate to the heads of wild animals which two centuries ago were paid for out of the Churchwarden's "cess." These notes are interesting as showing the former abundance of several of the species named compared with the present day, when, in many parts of England, most of them are very rare or altogether extinct.

1677.

John Hoaron in Dilston, one wild cat head, one fulmart head.	
January the 27th Day.	1677
John Fawset in Corbridge, one otter head. Febru. ye twenty-fourth Day.	1677
John Hoaron in Dilston, one fox head. March 10th day.	1677
Richard Robinson, the Laughhouse, one fulmart head. March the 17th day.	1677
John Haggot in Dilston, 2 gleads heads. June the 8th day.	1677
John Fawset, one fox head. June the 24.	1677
George Hoaron in Dilston, one fox head. July the first day.	
Robert Gray in Dilston, one fulmart head. July ye 8 day.	
John Hoaron in Dilston, two fulmarts, one brocks head. Sep.	
John Hoaron in Dilston, 4 fulmarts heads. Sep. the last day.	
George Hoaron in Dilston, four wild cats heads and——*	
George Hearon in Dilston, two ——* October the 21st day.	1677
Wild Cats heads, two fulmarts heads. October the 28th day.	1677
Nicholas Greenwell, one glead head. Novem. the 8th.	
John Hudspeth ye holl, one glead head. Nov. the 16th.	
George Hoaron in Dilston, one fox head, two fulmarts, two otter heads, and three wild cats heads. November.	
John Hudspeth ye holl, one glead head. Nov. 23.	1677
John Fawset, one fox head. Novem. the 28th day.	
John Fawset in Corbridge, one fox head. Novembr the 28th day.	
John Fawset, one fox head. Decemr ye 9th day.	

* A portion of the page here is torn.

John Hoaran in Dilston, one fox head, three fulmarts heads.

December ye ninth day.

1677

John Hoaran in Dilston, two fox heads. Decembr the 16th day.

1677

Richard Corington in Corbridge, one fox head. Jany ye 3 day.

1702.

John Hypell, 5 fox heads. May 13, 14, 15th.

Thomas Jopling 1 brock head. June 1.

John Heypell, 4 gleads heads. June 1.

Thomas Jopling, 2 brock heads. June 3.

Ralph Lumby, one fox head. June 4th.

1702

John Hypell, 2 brocks heads. June 5th.

1702

George Rothwell, 1 brocks head. June 10th.

1702

Robt. Barnes, 1 brock head. June 10th.

1702

Thos. Jopling, 2 brocks heads. June 13th.

1702

Michael Stokoe, 1 otter head. June 10th.

1702

John Armstrong, one fulmart head. July 8th.

1702

John Addison, one fulmart head. Sepr. 30.

1702

John Addison, one fulmart head. Octr. 4.

1702

Thos. Jopling, 1 fulmart head. Octr. 5.

1702

Cha. Hutchinson, one fox head. Decr. 8.

1702

John Addison, one fulmart head. Jany. 13.

1702

John Haggart, 1 brock head, 2 fulmart heads. March 14.

1702

1723.

Thos. Jopling, 1 fulmart head. April 10.

1723

John Armstrong, 1 wild cats head. April 11.

"

Thos. Jopling, 1 fulmart head, April 12 more 2 fulmart heads.

"

Robt. Rutter, 1 fulmart head. April 13.

"

Edw. Giles, 4 fulmart heads. Jany. 13.

"

Matt. Thompson, 2 fox heads. April 14.

"

John Hepple, 1 fox head. Aug. 15.

"

Wm. Milburn, one brock head. October 6.

"

Abraham Fawsit, one fulmart head. Oct. 26.

"

John Hepple, 5 fox heads. November 18th.

"

Matt. Thompson, 1 glead head. December 16th.

1723

1741.

Miscellaneous Items.

To Dr. Charlton, for a fox head, 1s.; a fox and an otter head

more 1s. 4d.

3 fox heads by Mr. Fenwick's huntsman * . . . 0 0 " 0 3 " 0 0

* It is stated by Mackenzie, in his 'History of Newcastle' (1827), vol. i., p. 293, that it was customary so late as the seventeenth century for persons

Mr. Fenwick was the owner of the Bywell estates; one of his huntsmen (possibly the one here mentioned) was drowned when crossing the River Tyne while following the hounds. His body was afterwards found on the coast of Holland, and recognised by the name engraved on his horn, which was fastened to a leather belt.

1743: 23 fulmarts heads and a wild cats head to Cath. Robson 0 - 8 - 0

1705, Sepr. 30, John Thompson, 18 fulmart heads, 1 cat & 1 glead head.

1690, Oct. 29: John Haggard in Dilston, 2 fox heads, 1 brock head, 2 cats heads, five fulmart heads.

1704: Dec. 3: John Thompson, 10 fulmart heads, 1 glead head.

1729: April 19: Wm. Brown, 5 gleads heads.

1710: Jan. 14: Wm. Bell, 13 fulmarts heads, 2 wild cats heads.

*Total number of Wild Animals killed around Corbridge between the years
1677 and 1724.*

Foxes	at 1s. per head	367
Fulmarts	„ 4d.	„	.	.	.	653
Brocks	„ 4d.	„	.	.	.	119
Wild Cats	„ 4d.	„	.	.	.	141
Otters	„ 4d.	„	.	.	.	27
Gledes	„ 3d.	„	.	.	.	153
Total						<u>1460</u>

These numbers scarcely represent the correct total, for several pages in the accounts referred to have been torn or defaced, and doubtless more animals were killed than are here accounted for.

During the period when wild animals were numerous in this district there was comparatively little cultivated land, the greatest part being moor, common, or waste land, thick forests, boggy ground, and rabbit warrens. An Act of Parliament was passed in 1766, “for the division and enclosure of certain open common fields, stinted pastures, and common moors or waste grounds within the manor and parish of Corbridge,” and was completed in 1779. Not only were all these lands divided, but good roads

to bring the heads of foxes slain within the parish of All Saints, Newcastle-upon-Tyne, and nail them to the church-door, for which they were paid by the Churchwardens a shilling a head. An order was made at Easter, 1674, that the new chosen Churchwardens should not allow the continuance of this practice, but that all such persons should go to the town chamber, and there demand the old custom.—ED.

were made wherever required within the said boundary. This encouraged and facilitated an increase of cultivated ground, and just in proportion as cultivation extended, so did the number of wild animals decrease. It is now many years, with rare exceptions, since Glede, Brock, Wild Cat, or even a Fulmart were seen. Mr. Forster saw a Brock, a long time ago, which had been caught at Eden Castle Dene, near Corbridge. Fifty years ago, Magpies, Owls, Hawks, Jays, &c., were numerous, now they are rarely seen in this neighbourhood, having been destroyed as "vermin" by the gamekeepers.

THE LAND AND FRESH-WATER SHELLS OF THE NEIGHBOURHOOD OF YORK.

BY ROBERT MILLER CHRISTY.

THE district, the Conchology of which I have attempted to treat in the following pages, may be briefly described as a circular tract of country having the city of York as its centre, and a radius of about fifteen miles, though by far the greater number of species mentioned have been obtained in the immediate vicinity of the city. Throughout I have adopted very nearly the same nomenclature as Mr. Jeffreys, in his 'British Conchology.'

The list is to a large extent the result of my own research, but for assistance and information I have especially to thank Mr. James Backhouse and the Rev. W. C. Hey, of York, Mr. H. Richardson, of Newcastle, and other friends. Their contributions are distinguished by having the initial letter of their respective surnames affixed. Mr. Hey has gone so far as to prepare a list of what he has observed, and I have extracted much valuable information from it.

As the Geology of a district has such an important bearing on the Conchology, my friend Mr. J. E. Clark, of York, has kindly forwarded me the following remarks on the district under consideration. He says:—

"The Geology of the district is not of a character to make a very extensive catalogue probable, as there is an entire absence of chalk or limestone rocks within the area. The magnesian limestone runs almost north and south on the west about eight miles distant; whilst the wolds on the east, consisting of oolitic

and chalk rocks, do not approach within ten miles, but would doubtless produce different species of shells. The Ouse Valley between these low-lying escarpments is formed of a succession of recent deposits lying upon the Keuper and Bunter beds. These cannot greatly affect the Conchology of the neighbourhood, as they only approach the surface here and there, as near Poppleton and Rufforth. In the Ouse Valley itself boulder clays, with limestone, sandstone, and igneous blocks, form the chief beds. These are separated by glacial sands, which produce numerous waste moorlands when forming the surface soil, the clays below making them very retentive. Such are Strensall and Riccall Commons, Tillmire, and other tracts of equally poor land, though now cultivated. The clays often rise to small hills, seventy to a hundred feet above the Ouse, such as the site of the Retreat, the Mount, Severus' Mount, &c. Near the river their crests are chiefly gravel-beds, evidently the boulder clay rearranged, with the lighter parts sifted out. Depressions occasionally contain peat, as at Askham Bog, the Foss Islands, &c.; but are generally levelled up with brick-earths, which also underlie these peat deposits."

Our chief localities for water-shells are the broad and sluggish Ouse, with its smaller tributary, the Foss, Askham Bog and Hobmoor, the latter being a group of very large and weedy brick-ponds, and the former a mixture of brick-ponds, bog, wide marshy ditches and wood. For a fuller notice of it and its numerous Natural-History productions, including shells, I must refer the reader to a series of papers that appeared last year in 'The Natural History Journal,' and have now been published in a pamphlet form (W. Sessions, York). It appears that there are at least forty-one species of Mollusca found within its borders, and on a recent visit of the Yorkshire Naturalists' Union, twenty-three were obtained, though *Ancylus lacustris* and *Zonites radiatulus* were missed. To the localities mentioned must be added numerous ponds in the corners of fields, and various ditches and streams. Askham Bog and Hobmoor also are among the most productive of the localities for terrestrial mollusks, as well as the extensive Jugs beside the river at Clifton and Bishopthorpe. In acquiring material for this list I have largely availed myself of the herculean labours of our two rivers in the way of shell-collecting. This, though a most productive way of obtaining information and

specimens, is a method which to my mind is not sufficiently taken advantage of by conchologists. The vast number of small shells collected and deposited in certain places even by a little stream is surprising, but it is considerably less so when we consider what a large area its waters cover when in a flooded state, and that all small shells float when empty. The principal sorts so to be obtained are the *Zonites*, the smaller *Helices* and *Clausiliæ*, but particularly the *Pupæ* and *Vertigoes*. As my drift for examination has been entirely obtained near the city, it cannot well be urged that the shells in it have travelled from beyond our boundaries.

I am far from believing that the list is a complete one, though the eighty-nine species, or thereabouts, mentioned make a very fair total. I shall always be pleased to hear of any additions.

I. AQUATIC MOLLUSCA.

BIVALVES (*CONCHIFERA*).

Order LAMELLIBRANCHIATA.

Fam. SPHÆRIIDÆ.

Sphærium corneum.—Fine and abundant throughout the district generally. The finest specimens I have got near York are from Foss Islands (H.) Pale grey variety at Askham Bog (H.)

Var. *flavescens*.—Not uncommon. Good at Hobmoor and Askham Bog. "Very abundant this year in the lower part of the Foss" (H.)

Var. *nucleus* and var. *pisidioides*.—I have taken both these near the city, but cannot name the exact locality.

Sphærium rivicola.—Abundant and fine in the River Foss at Blue Bridge (H.) Rare in the Ouse.

Sphærium ovale.—Mr. Hey writes:—"Abundant and very fine in the Foss, burrowing to a depth of several inches in the mud. I first found it near Blue Bridge in the summer of 1874; but it was nearly killed by a severe frost when the water was let off in January, 1880, so that in June following I was not able to find any specimens."

Sphærium lacustre.—A comparative rarity throughout the whole York district. I have occasionally obtained it at Hobmoor, Askham Bog, Stockton-on-the-Forest, and in the Foss. Common in ponds at Rawcliffe, and also in several ponds near Clifton, in which it positively teems at times, but at others is scarce (H.)

Var. *Brochoniana*.—"Used to occur at Layerthorp on the Foss, but I have not seen it of late years" (H.) In August, 1876, the Ouse was lowered, and the water remained for several days about ten feet below its usual level, affording an excellent opportunity for shell collectors. Among other things seven or eight specimens of this variety were obtained under large stones. It is much larger than the type-form, very flattened, and the umbones small but prominent. Mr. Hey writes:—"The profusion and variety of *Sphæriums* in the Foss is remarkable, the whole genus abounding at one place; but it is grievous to have to mourn its growing rarity, as it is most unpropitious for mollusks when the water is let out of the river in winter and the poor wretches are frozen to death."

Pisidium amnicum.—Fairly common both in the Foss and in the Ouse, but I have not met with it elsewhere.

Pisidium fontinale.—Common.

Var. *Henslowana*.—"Common in sand dredged from the river Ouse" (B.)

Var. *pulchella*.—Common enough, I believe.

Var. *cinerea*.—I have met with this in the ponds on Tillmire, and a few other places.

Pisidium pusillum.—Generally distributed (H.) Specimens from York in the British Museum. Hobmoor, Askham, &c. I once found myriads in a tiny ditch in the centre of a field between Bishopthorpe and York. The water was very strongly impregnated with iron and their shells encrusted with it.

Var. *obtusale*.—Also specimens in the British Museum. Common generally.

Pisidium nitidum.—Streams at Hobmoor, according to Mr. Joseph Taylor, of Sunderland.

FAM. UNIONIDÆ.

Unio tumidus.—In the Ouse, but very rare. Abundant in the Foss. Mr. Hey says that it was formerly very common in the latter river, but is now very rare on account of its being killed by the frost when the water is let out in winter. "There are two distinct forms:—(a) Wedge-shaped, ventricose, thick, and of a rich red-brown colour; (b) Longer, thinner, greenish, and almost the var. *radiata*. I have some specimens which are curved like *margaritifer*; others which seem intermediate between

tumidus and *pictorum*, and one of abnormal dimensions and thickness."

Var. *radiata*.—Occurs among the rest.

Var. *ovalis*.—"Ouse above York" (Brown's 'Illust. Conchology,' p. 111).

Var. *radiat-ovalis*.—In November, 1877, I obtained from the Foss, by Yearsley Lock, several dead specimens of the variety which has, I believe, received this name at the hands of various Bristol conchologists. In shape it is the same as the true var. *ovalis*, but differs from it in colour, which should be of a very dark brown, but is light greenish, like the var. *radiata*; hence the name.

Unio pictorum.—Very fine and very abundant in the Ouse, but the number below the city far exceeds that above. Also in great profusion in the Foss, particularly near Foss Islands (H.) From one specimen I obtained a pearl about the size of a No. 1 shot, but irregularly shaped.

Var. *radiata*.—Pretty common among the rest.

Var. *curvirostris*.—Both in the Ouse and in the Foss, but not common in either.

Anadonta cygnea.—Fine in the largest pond at Hobmoor, and probably also at Askham. Very abundant in the Foss above Yearsley Lock (H.) A gigantic specimen in the York Museum came out of Fairfield Pond (H.) A curious stunted form is found in the Ouse near New Walk (H.)

Var. *rostrata*.—A number in the Foss are, I believe, of this variety.

Var. *avonensis*, Turton.—In the Ouse, but not abundant. I do not know what this corresponds to in Mr. Jeffrey's work.

Var. *radiata*.—In the Foss near Blue Bridge, abundant and very fine (H.)

Anadonta anatina.—Prevails in the Foss below Yearsley Lock (H.) To be found in the Ouse in any quantity; but none are large, the biggest I have seen not measuring four inches in width. Whether the inhabitants of York eat them or not I cannot say, but frequently when the water has been low, and I have been collecting them, I have been asked, in the most innocent way possible, whether I was going to do so. When the river is lowered, they extend their large foot and crawl down the bank into the water again, their track being shown by a queer cut

in the soft mud. The *Unios* appear not to have the power of doing this. At such times, too, a great number fall victims to the rats, which break their shells and eat the mollusks inside, though the thicker shells of the *Unios* defy them.

UNIVALVES (*GASTEROPODA*).

Order PECTINIBRANCHIATA.

Fam. NERITIDÆ.

Neritina fluviatilis.—Many in the Foss near Yearsley Lock. Very abundant in the Ouse both above and below the city, but particularly so just above Scarbro' Railway Bridge, where there are a great many stones which they frequent. All those in the Ouse are more or less what Mr. Jeffreys refers to when he says, "Mr. North has found a black variety in the Ouse." Whoever bestowed upon it the name of "variety *nigrescens*" might well have saved himself the trouble, for in my idea its colour is due to nothing but the impurities in the water.

Fam. PALUDINIDÆ.

Paludina contecta.—"Stream near York," say Dixon & Watson, doubtless referring to the locality near Cherry Hill well known to Bootham conchologists of ten years ago, but now almost forgotten. In October, 1877, I visited the stream this mollusk used to inhabit, but found it now so surrounded with houses and in such an indescribable state of filth, from the refuse of some works being thrown into it, that it was difficult to imagine any Mollusca living there. I and others have visited it unsuccessfully, and I am afraid it must now be looked upon as a locality of the past, though I have more than once found dead specimens near by.

Paludina vivipara.—This is difficult to obtain when the water in the Ouse is at its full height, but when it is lowered, as it was in August, 1876, I could obtain it in any quantity. Above the city it is rather uncommon, but below it abounds, and lives principally clustered round the mouths of the small ditches and drains that discharge into the river on the Bishopthorpe side. Probably it prefers these situations on account of the sewage and filth there to be obtained. Many of those obtained in 1876 contained young, forty or fifty in each being no uncommon number. I was much interested in watching some that I had in an aquarium, where, under the influence of clear water, in a few weeks they lost

most of the thick incrustation on their shells. Meat was their principal food, and if in a high state of putridity it mattered nothing. Young specimens seemed to be far more lively than older ones. On one occasion one of my largest specimens underwent the misfortune of being ejected, and for more than three weeks lay on the ground in a field, but upon being restored to its fellows seemed to have taken no harm. On May 11th, 1877, a young one was born and others followed until the 18th. At first each seemed to be enclosed within a ball of slime, but after getting free of this was very active. A few years ago the number in the River Foss was very limited, but Mr. Hey writes that, "Though it continues to abound in the Ouse, by far the finest specimens now come out of the Foss, where it has grown equally common."

Var. albida.—I admit this only with great doubt, there being no recorded variety of this name, nor have I ever heard of specimens, except two in the collection in York Museum. They are pure white, rather small, and have "var." written on their label. The late curator, Mr. Wakefield, says they are genuine, and were left by Prof. Phillips, but their locality is quite unknown.

Bythinia tentaculata.—Very common. Foss, Askham Bog, Hobmoor, &c. A variety with a single white band occurs at Askham Bog (H.)

Bythinia Leachii.—Common, but not generally of large size, in the River Foss. Mr. Hey says only as far up as Huntington. Also in a small stream joining the Foss near the third lock. It has the power, like most other operculated water-shells, of remaining out of water a considerable time, even weeks.

FAM. VALVATIDÆ.

Valvata piscinalis.—Abundant in the Foss, from which I have a specimen with the whorls much distorted. Ouse at Naburn. Also occurs, but rarely, in Askham Bog (H.)

Var. depressa.—Specimens from York are in the British Museum.

Var. acuminata.—Few in the Foss (R.)

Valvata cristata.—Pretty numerous in the Foss and its small tributary, a few in the Ouse, and very abundant in certain ponds at Askham Bog, where Mr. Hey says it is greatly on the increase.

Order PULMONOBRANCHIATA.

Fam. LIMNÆIDÆ.

Planorbis lineatus.—The Bootham 'Observer' states that this used to be observed in the Hobmoor ponds. The same authority says that in 1855 it was found in the ponds on Tillmire, and four years later in the direction of Osbaldwick, but I have met with it nowhere except at Askham, where in certain of the ponds it positively teems, though in others it is not found. Unlike the following species, which generally lives among decaying leaves in very stagnant ponds, this seems to prefer clearer and shallower pools where grass is growing.

Planorbis nitidus.—Rather sparingly distributed in the York district. I have found it, but not commonly, in the Foss and in one pond at Hobmoor. A pond near Rawcliffe Lodge (H.) Abounds in a pond beyond the first toll-bar on the Wiggington road and in some of the Askham ponds (H.)

Planorbis nautilus.—Found abundantly in some ponds at Askham Bog and Hobmoor, rarely in the Foss, and very probably in other places, but its small size renders it difficult of discovery. Rare in the Ouse (R.) Several ponds near Clifton, but specimens from here are only slightly "crested" compared with those from Askham (H.) The caddis-worm is very fond of sticking the shells of this species to its case, their roughness doubtless giving a secure hold. I have cases with one hundred or more sticking to them.

Planorbis albus.—Sparingly distributed. I have met with it pretty commonly in the Foss; also in some of the ponds on Strensall Common, at Hobmoor, and Askham. Near Osbaldwick ('Observer,' 1859). Pond on Clifton Jugs in profusion (H.) Holgate Brick Ponds (H.)

Planorbis spirorbis.—General and abundant, particularly in the many small ponds in the corners of fields near the Bookham Junction signal-box. Also Askham and other places. It teems on the Bog now (H.)

Planorbis vortex.—In great numbers in a ditch on Clifton Jugs, a pond beside the Foss, and a few other places, but by no means common or widely distributed. Mr. Hey has never found this, and doubts whether I am not mistaken.

Planorbis carinatus.—Common and well distributed. Askham, Hobmoor, the Foss, &c., are its localities.

Planorbis complanatus.—Very abundant. Found in most suitable ponds or ditches. Askham, Hobmoor, the Foss, Bishopthorpe Jugs, ditches round Huntington, &c. It is much subject to monstrosity; one was obtained at Bishopthorpe which rose in the centre like a cone, and another I got near the Foss had the whorls very much distorted.

Var. *rhombea*.—A few in a pond at Bishopthorpe, and in one of the Hobmoor ponds. This must be distinguished from the young, which also has little or no keel.

Planorbis corneus.—Clifton (H.) Strensall, Askham, Hobmoor, stream beside the Foss, Bishopthorpe, &c. Common. Especially good at times near the latter place. The very young specimens have a curious appearance, being hairy.

Planorbis contortus.—Pretty common. Abundant, but always small, both at Askham and Hobmoor. Larger, however, at Bishopthorpe. Thousands upon thousands of exceedingly fine specimens live in a tiny pond—than which I never saw a filthier—near the south end of Scarborough railway-bridge.

Physa hypnorum.—Very abundant indeed in the York district, and, I think, unusually fine. In vast numbers in a certain pond at Bishopthorpe, where I could obtain it by handfuls one summer, when it was dried up. One individual actually measured four-fifths of an inch in length. Also common in the ditches there, by Acomb Wood, the stream on Clifton Jugs, the small ditch where I found *P. pusillum* so numerous, a dirty ditch beside the public footpath to the north end of Scarborough bridge, Poppleton, Bootham, Tillmire, Strensall, Knavesmire, and elsewhere. Pond near Burton Lane, Clifton (R.)

Physa fontinalis.—Decidedly less common than the last species mentioned. Unusually fine in the Foss, near Huntington (H.), and at Hobmoor. Also found at Askham, Bishopthorpe, and many other places.

Limnæa peregra.—Of course found in the greatest abundance. A ditch that produces nothing else will certainly yield this. Doubtless many other named varieties occur, but I have not studied them sufficiently to be able to identify them. One I kept in captivity deposited two lumps of spawn, containing about 280 eggs altogether, upon the glass on the 19th May, 1877. These

hatched on the 19th June following. The young were lively and crawled about at once. A dwarf form abounds in deepish water in the Ouse (H.) A very large form, hardly distinguishable from *L. auricularia* (with reflected lip, &c.), at Middlethorp. A long-spined and small-mouthed form used to occur in a ditch at Clifton (H.) Intorted spire, very like *L. involuta*; one specimen in the Foss (H.)

Var. *ovata*.—Not uncommon, I believe.

Var. *acuta*.—Not uncommon. Water-tank, Bootham.

Var. *acuminata*.—Abundant in the largest pond north of the railway at Hobmoor. In shape it is very like a small *L. auricularia* having the lip inflated. In mild weather they often crawl on the top of the duckweed, and if a breeze blows them up to one end of the pond they are to be obtained in great numbers.

Var. *succineæformis*.—A small, fragile form in a pond at Askham, I think, answers to this.

Limnæa auricularia.—Occurs rarely in the Ouse, and used to do so more abundantly in the Foss than at present. A few years ago, when the water was let out, it was to be found in great numbers, and often very fine; indeed Mr. Wakefield, the late curator of the museum, once showed me some from here far larger than any I have ever seen from elsewhere.

Var. *acuta*.—Pretty common in the Foss, and also very fine at times.

Limnæa stagnalis.—Quite a rarity, compared with its abundance in some districts. It is, however, common in one pond and some of the ditches at Askham, but it never attains a large size there, and its shell is mostly much corroded. Common in one or two ponds at Hobmoor, a few in the Foss, and in a ditch near Strensall, and abundant in a pond on the Common itself. It varies much in shape, those from the last locality having very short spires.

Limnæa palustris.—Rather well distributed; in a ditch behind the Foss near Huntington, in one pond and many of the ditches at Askham Bog, common.

Limnæa truncatula.—Abundant with, I think, several of its varieties. Puddles in Skelton Lane, &c. (H.) Ditches by Bishopthorpe, on Clifton Jugs, by Acomb Wood, Walmgate Stray, &c. It is semi-amphibious, and if the tiny ditches it frequents happen to dry up, the consequences are in no way serious to it.

Limnæa glabra.—This seemed to me to become suddenly abundant during 1877. At any rate I had always before that looked upon it as quite a rarity, but in the autumn of that year I found it plentiful in various ponds near the Bootham Junction signal-box, on Tillmire, in ditches along the sides of both Acomb and Knavesmire Woods, in various ponds and ditches on or near Strensall Common, and several other localities. Mr. Jeffreys mentions York as a habitat and it used formerly to be found at Langwith (B.) It also occurs now in the first pond at Askham Bog (R.); and in many ponds about Clifton, sometimes in abundance (H.).

Var. *albida*.—About Clifton (H.)

Ancylus fluviatilis.—As there are so few streams round York adapted to the requirements of this species, it is not to be wondered at that it is rare. It lives in fair numbers in stony places in the Ouse and also in the Foss, where the current runs over many large stones at Yearsley Lock.

Ancylus lacustris.—Few and small in the Foss, at Hobmoor, Askham, and doubtless some other places. A sure method of finding it is to pull up the large flags and other weeds and carefully examine them. Fairly abundant in a pond on the Wiggington Road (H.)

(To be continued.)

ORNITHOLOGICAL NOTES FROM LANCASHIRE.

BY F. S. MITCHELL.

THE following notes represent some of the experiences of myself and my coadjutor, T. Altham, for the last few years in Clitheroe and its neighbourhood. The town lies in the middle of the Ribble valley, which is both well wooded and well watered, and is bounded on one side by Pendle, over 1800 feet in height, and on the other by the lesser fells of Waddington and Grindleton. There is, therefore, plenty of variety of bird ground, and within a radius of three miles from Clitheroe seventy-three species breed yearly, from the Curlew to the Grasshopper Warbler, and from the Twite to the Landrail.

I have been for some years working at the birds of Lancashire, and should be very grateful for any aid in the way of lists

of residents and rare visitors in any part of the county, and in fact for any information coming within the scope of the subject.

In 'The Zoologist' for 1872 Mr. J. E. Harting has included amongst the Yorkshire heronries, "Browsholme Hall, near Clitheroe, in the West Riding (Mr. Parker)." At that date this heronry was not in existence, having been deserted for some time, but I am glad to say that it has been rehabilitated, and that there is every prospect now of its continuance. The birds have chosen a clump of very fine old spruce trees on the Pilling-Taylor estate, just on the opposite side of the road to that of Browsholme, and on the Yorkshire side of the Hodder, about a mile from the river. Mr. Parker is, however, taking great interest in their welfare, and the thanks of all naturalists are due to him and to Col. Hargreaves, who has the game-right, for preserving from molestation the breeding-place of this interesting species. The Herons first made their appearance in 1877, and on the 31st March in that year a nest of five eggs was seen by Altham. Since then they have been under constant observation by myself and him, and perhaps the following notes may be acceptable.

A nest which, on the 8th April, 1877, had four eggs, a few days sat, and two of which we left, had on April 22nd one of these eggs just chipped by the young inside. On April 29th there was only one young one newly born, and it would appear as if the one preparing to emerge on the 22nd had died, and been got rid of somehow.

Another nest, on April 8th, had five eggs, a few days sat; three were left, and on the 22nd we found two young just hatched, one of which I took. On April 29th I took the second young one, now a week old; the remaining egg was only just hatched, the legs of the young bird being entirely flesh-coloured.

The soft parts of the young are coloured as follows:—Immediately after birth the irides are a very light yellow, the upper mandible black, with a white spot at the point, the lower a pale yellowish horn-colour and black-edged; the throat outside of a pinky flesh-colour, and the gape a bright pink; legs and feet lead-colour in front, yellowish behind; claws horny. At one and two weeks the gape was not as brightly coloured, the throat outside being olive-green; the legs and feet were of a decided olive-

green in front, the colour behind being lighter, and more tinged with yellow; abdomen yellowish green; claws black. At three weeks the irides were a very bright yellow, the upper mandible being greenish black, lighter on the culmen, and with the white spot still near the point; the lower mandible yellowish horn, gape pink, legs dusky green, and claws black.

In the stomach of that two weeks old I found about half a yard of line, with a broken hook at one end, and two lead sinkers attached; no doubt the old bird had got hold of a fish caught by a night-line, had torn it loose, and presented the whole arrangement to its offspring.

The total number of nests in 1877 was eight, and three eggs was the smallest complete number. They were all in the tops of tall spruce firs, being placed on the branches a little way out from the trunk, and were composed of large sticks, lined with finer twigs. Between the extreme edges, though the sticks here were very loosely put together, they measured about two feet and a half, and in the middle were six inches thick.

Some nests have a considerable depression, preserved until the young are hatched, when of course they are flattened completely, whilst others are almost flat to begin with. On April 14th, 1878, a very flat nest, which a few days before had two eggs in, was empty, the eggs being found at the foot of the tree; they must have rolled out somehow. In 1878 there were fresh eggs on April 4th, and in 1879 on March 23rd. On May 17th, 1879, we counted sixteen nests from which the young had gone. One held one young one almost full-grown, and two others had eggs in, no doubt from birds whose first clutches had been taken, some boys from the town having managed to elude the vigilance of the keepers. One or two nests were in outlying trees at some distance from the main body.

On March 21st, 1880, we saw seven nests with eggs, and on April 4th ten. On the 25th almost all the trees had broken shells under, and I climbed to one nest which had four young a fortnight old. On June 3rd all the young were flying, and they and the old ones careering overhead when disturbed were a fine sight. There were fifteen nests in all, and the largest number of eggs in any one was six. This year, 1881, I visited the place on March 27th, but no birds were visible, though the keeper informed me they had been about for two or three weeks. The

weather was very wintry, deep snow being on the ground, and this had no doubt retarded them.

The year 1877 also brought another bird into this district, which I do not find previously recorded, viz., the Stock Dove (*Columba ænas*, L.) On May 3rd I saw a nest with two fresh eggs in a hole under a tree-root, which grew from a steep bank overhanging the River Hodder, about thirty feet above its bed. The female was caught on the nest, though its tail came out in the process (pigeons' feathers are so very loose), but I kept her for twelve months, and in that time she grew a very fine new one. In 1878 a pair brought up their young safely, just below Hodder Bridge, and in 1879 I took a nest containing two eggs, a week sat, from much the same position, in another steep bank as that first named. On March 26th, 1880, I met a boy who had taken two fresh eggs from one nest, and one from another; he said there were several pairs, and it is evidently spreading in this direction. On the sea-coast it is not uncommon. In 'The Zoologist' for July and December, 1873, appear records of nests taken near Southport; and Dr. St. Clair, of Blackpool, informs me that near St. Anne's he found a nest on the sandhills on May 13th, 1879, and caught the old bird.

In 1876 the well-known gullery on Pilling Moss was sacrificed to land improvement, and the plough, which for some time had been gradually approaching its precincts, finally effaced it in that year. It is a question whether the extra potatoes grown would have compensated for the good the birds do in the way of snail destruction, but, happily for the farmers, they did not migrate far, and at Winmarleigh, where they will receive protection, they found a suitable abiding place. They came to Pilling Moss about 1841, so that their sojourn there lasted thirty-five years.

The Corn Crake a few years ago had got quite scarce in Ribblesdale, and I think I remember observers in other parts of the country noticing the same thing. We fancy here that machine mowing has something to do with it, and there is no doubt that many more nests are destroyed by the closer shaving to which the meadows are subjected, and the relentless character of the machine scythe. In 1880, however, they were in larger numbers again. Perhaps they are getting more knowing, and the Corn Crakes with a greater knowledge of machinery are being "naturally selected."

The young Marsh Harrier referred to in 'The Zoologist' for 1879 (pp. 13, 14), died on July 26th, 1872, probably through some neglect, as I was away at the time. Its plumage was as follows:—Top of head white, bases of feathers white; general colour dusky, almost black; tail-feathers very slightly tipped with chestnut, the new feathers sprouting also thus tipped, all being white at the base; the inner web of the outermost feather clouded with chestnut from white portion to tip. Legs feathered to tarsal joint. Some feathers on nape irregularly margined with chestnut and white. Secondaries very slightly tipped with light chestnut, white at base. Primaries and tertials not so tipped. Primaries white at base, shading off through cloudy black to chestnut (especially on inner webs) to black upper part. Greater wing-coverts tipped with chestnut. Lesser wing-coverts not so. Most of small feathers clothing cubitus so much bordered with white and chestnut as almost to obliterate the black.

In 1879 I had a very interesting morning's ramble on May 10th, leaving home for Pendle Hill at two a.m. A quarter of an hour later, whilst still quite dark, Snipe were going "tick-tick," and a few Peewits calling. Two Snipe were drumming at the foot of the hill at half-past two, and a Blackbird or two called as I went up the gully called the "Big Nick" at three. Blackbirds and Ring Ouzels both breed among the furze-bushes here, sometimes in the bushes, and sometimes on the ground under them, and it is absolutely necessary, in order to identify nests properly, to see the birds. Curlews were calling soon after three, the dawn streaks just appearing, but I did not see them, as they were on another part of the hill.

In the middle of a smart shower of snow I disturbed a Golden Plover from its nest of four eggs, which turned out to be a week sat. She flew away with just one whistle when she had got twenty yards from the nest. I waited twenty minutes in hiding for her, but she only reappeared—though I heard her whistling a long way off—when I was packing the eggs by the side of the nest. She was very shy, and kept thirty or forty yards off, flying a long way when I moved towards her. These birds are more common on the Bleasdale fells, the other side the valley; Altham saw a nest on Parlick May 25th, with two young in down and a chipped egg. There were no Ring Ouzels to be seen, nor were there any Warblers in the Measley

Woods, but in the latter place I saw a male Redstart, the first of the spring.

The following story of a Peewit's nest is, I think, worth recording:—On the evening of May 15th Altham found it with four eggs in, three of which were completely covered by a dry cake of cow-dung, probably kicked over it by accident by the cattle. The birds had evidently been trying to remove it, but had not been able. The eggs were cold, but he took them home, put them in the oven all night, and at six a.m. next day took them to the nest again. The old birds met him at the stile, "as if they knew what he had got," he said, and the hen went on at once, after his replacing the eggs in the nest, and removing himself. Next morning three eggs were hatched, and the young gone; the remaining egg had got cracked.

Golderests were very scarce on Longridge this year, where generally they are pretty numerous. The severe winter must have thinned their numbers sadly.

On June 12th, between Blackpool and Lytham, I started several Nightjars from among the sandhills. They were either very sleepy or very tired, as I nearly caught them with my hands. If migrating, they were very late, as on Longridge they commonly lay their eggs the first week in June.

July 11th. Disturbed a Dipper from its nest, below which was quite a heap of young minnows. Saw a Kingfisher's nest also, with six fresh eggs, there being a great many fish-bones round them. A few years ago we almost despaired of retaining the Kingfisher about us as a breeding species. The demand for them was so great, owing to the prevailing fashion in ladies' head-gear, that they became nearly exterminated, and their being so easy to catch in nets didn't keep them. On one brook where were five pairs, a man, in a single afternoon netted nine birds. However, they are getting more numerous again now, and one can only hope that fashion will not for some time to come cast its evil eye on the feathers of birds.

October 1. Mr. Naylor had a Short-eared Owl brought him in the flesh from Balderstone, where it had been shot, and another (a very light variety) was killed on Longridge on the 10th. On the 1st also Altham saw a nest of young House Martins washed down by heavy rain; the old birds had tried to get them away for several days, but had not succeeded.

In the possession of Mr. W. Johnson, of Prestwich, I saw a very fine Bittern, which had been shot at Huntley Brook, near Bury, on December 15th.

On March 30th, 1880, Mr. Naylor had brought to him a Long-eared Owl, which a keeper had shot in mistake for a hawk, a Blackbird, by its notes of alarm, having called his attention to it. In its stomach was a bird of the Thrush family almost whole. All the Owls except the Barn, which is now most jealously protected by the farmers, and which it is thought unlucky to disturb, are ruthlessly shot down by the keepers, and they are rarely met with. A Barn Owl was once seen by some keepers to strike a young Pheasant about some coops in the late afternoon, but it left it where killed, and did not carry it away; it was thought it mistook it for a mouse. I was told a story of a Tawny Owl, which would seem to indicate much intelligence. It was observed several times to alight on the top of a Pheasant coop in the evening, and to flap its wings about so as, apparently, to disturb the old bird inside. On her moving the little ones, as usual, all ran from her, and were picked up by the waiting Owl outside and devoured. In the end of course it paid the penalty. On the western side of the valley here there is strict Pheasant preserving, and for the benefit of all egg-devouring birds, those of hens poisoned with strychnine are laid in conspicuous places. The havoc among Jays, Magpies, Rooks, and Carrion Crows is fearful. We are beginning to consider the Magpie a rare bird.

On May 8th walked over Pendle, near Pendleton Hall, heard the first Wood Warbler of the spring, and saw a Carrion Crow's nest, but did not climb up to it. On the slope at the foot of the hill the bird's-eye primrose was just coming into flower. At Deerstones took a nest of the Ring Ouzel with four eggs. Deerstones is the only rock on Pendle, and its ledges are sometimes used by the Kestrel for its nest. On a boulder at the foot of the rock are two depressions resembling a pair of long feet in shape, and the country people have a tradition that they are the footprints of his Satanic majesty, or, as they call him, "th' owd lad." A dog Fox and a lot of whelps were killed here in the winter.

May 9th. Spent this day on the moors near Todmorden, which separate Lancashire and Yorkshire. A single House

Martin, the first of the spring, was seen in the valley, and on the higher ground a pair of Ring Ouzels were disturbed, as also three or four Twites. Altham once found a Twite's nest on Pendle, and the old bird was singing as she sat upon her eggs. Our main object was to find the Little Stint, which has often occurred on these moors in May, but the ground was so dry from scarcity of rain and east winds that this had to be given up. A nest of young birds in down, thought by the finder to be those of the Little Stint, was taken on May 20th, 1876. These are still in his possession, and I borrowed one a little while ago, in order to compare it with Mr. Harvie-Brown's *Petchora* examples, which he kindly permitted me to do. Little doubt remained that it was a Dunlin, but the following particulars will show how important it is not to take uncertain nests of this sort without absolute identification. The finder of these young in down informed an old naturalist living near, a man perfectly acquainted with the Stints, and early in June he went on this moor, and saw an undoubted pair of the Little Stint, they being very tame, and permitting approach within five yards many times. No nest, however, was found. In 1877, on May 28th, another visit was paid, and a pair of birds again seen running like mice among the tufts, squeaking, but again no nest. 1876 and 1877 were very wet springs, and the moors were full of damp places, and covered with little pools. Every year since it has been very dry in spring, and no Stints have been seen. The old keeper who had been on the moor for forty years averred that he was familiar with a pair or two of birds, which appeared nearly every spring, not much bigger than larks, and resembling Dunlin, but without the black breast; he called them Little Dunlins, and was sure they bred. To some the idea of a bird breeding in Lancashire, whose eggs were unknown until the *Petchora* expedition may seem ridiculous, but I simply relate the facts, without drawing any conclusions, and only say that I have been impressed with the *bonâ fide* character of the evidence I have been able to gather. The Dunlin breeds every year on these moors, and we saw a fine one feeding, but could not raise its mate. It would seem to frequent the whole of the range. R. Leyland, of Halifax, says (*Mag. Nat. Hist.* 1828) that "it breeds on Blackstone Edge;" and on Pendle it has been seen several times in full breeding-plumage, though a thoroughly authenticated nest has never, that

I know of, been taken. Altham saw it on the Bowland fells in the spring of 1880.

On this 9th of May our further rambling brought us to the discovery of a Merlin's nest with four eggs, and Golden Plover were heard whistling in the distance, though we did not see them. A good many dead Grouse, all being males, were seen; the scarcity of water was very great.

June 3. Altham had heard a Chiff-chaff near the heronry, and we went to look for it, but did not any "chiffing" whilst we were there. He had also heard one near Colthurst, Sir John Holker's place. I had been told of its occurrence in this neighbourhood many years ago, but it has not been heard for a long interval till within a year or two. We have never been able to find a nest yet, though in Holland we saw them often, and spent a good many hours watching them. With regard to their note, too, we are unable to discover any different accentuation which might be translated into "chiff" and "chaff," though the late Mr. Thomas Garnett, of Clitheroe, always asserted this was the case. Maybe our ears are in fault.

June 20. Walking to-day over the Waddington Fells, and whilst looking for Nightjars in the open places of a little wood, we heard a tremendous row out on the open fell, and rushing to the wood-edge and peeping over the wall, we saw a great sight. Twelve old Curlews, all up at once, driving off four Carrion Crows. The alarm-note of the former became a perfectly hoarse bark, they were so enraged, and it was a long time before they settled again. We passed a sedge pool where, on May 31st, Altham saw a pair of Wild Ducks with seven young, and also came across a pair of Golden Plovers, very anxious, and with young doubtless. We found two Curlews' nests, both forsaken, one with two eggs in, and another with three, and about eight p.m. disturbed a pair of Twites, but could not find the nest.

In the first week of September, when sitting in the garden about seven in the evening, I noticed great numbers of Pied Wagtails flying into a high tree near. I began to count on September 2nd, and although the tree-top was already swarming, I saw 450 pass into it. It is common to see Pied and Ray's Wagtails roosting together in autumn in bushes overhanging ponds, but I never saw such an assemblage as this before. It went on every evening for about the whole week, and might have been a

party preparing for migration, though this species remains here in large numbers the whole winter. A Nuthatch, a rare bird here, was caught in one of the greenhouses at Waddow Hall some time about September. The gales from the north-east at the end of October brought quite a lot of uncommon birds into the neighbourhood. A Storm Petrel was caught in Padiham about the 23rd. The 'Manchester City News' recorded the capture of another at three a.m. on the 29th, and on the evening of the same day a third was killed by a cat at Rawtenstall.

A female Rough-legged Buzzard (recorded in the local papers as a Snowy Owl) was shot near the freestone quarries on Waddington Fell on October 30th; another was shot on Haslingden Moor by a Mr. Senior on October 11th, and several more have been already noticed in 'The Zoologist' and 'Field' as occurring in other parts of Lancashire.

On November 6th six Swallows were pointed out to me by Mr. Naylor flying about the streets of Whalley. It had been exceedingly frosty up to the morning of the 4th, when the wind changed to the south-west, making it very mild.

A birdstuffer in Clitheroe had two female Goosanders, which had been shot out of a flock of nine birds on January 22nd, 1881, on the Ribble near Henthorn. I saw the man who had killed them, and he said the flock had been on the river above a week.

February 15th. A Short-eared Owl shot on Bashall Moor on this date was brought to Mr. Naylor. This is a very favourite resort for these birds, and there is no doubt if they were let alone they would remain to breed. But that shall never be, say the guardians of the Pheasants.

On February 8th a Great Crested Grebe was shot on the Ribble, near Hacking Boat.

Geese were moving in February. On the 17th a flock of about eighty was seen by Altham, very high up, going from east to west, and a correspondent on Morecambe Bay informs me he saw a few Bean Geese on the 18th, and large flocks on the 19th, all going northwards.

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

BY JOHN GATCOMBE.

EARLY in January a Green Sandpiper was obtained near Plymouth, a very unusual date for this species to be met with in our neighbourhood, since it generally appears early in the autumn, and then but sparingly. Strange to say, I do not remember ever having seen a fresh specimen of the rarer Wood Sandpiper in the hands of any of the Plymouth birdstuffers, although it has not unfrequently been met with in Cornwall, especially in the Land's End district. Razorbills, Guillemots, and Kittiwakes were very plentiful, and some young Great Black-backed Gulls also made their appearance, as they generally do, just after Christmas, and later towards spring pairs of adult birds appear in great numbers previous to leaving for their breeding quarters. Several adult Gannets were obtained, and the stomachs of those I examined were full of Sprats.

On January 9th there was a very cold wind from the E.N.E. A large Northern Diver was fishing off the Devil's Point, Stonehouse, and an immense flock of Gulls, consisting of three or four hundred of various species, were to be seen crowding close together on the rocks near the Hoe, presenting such a sight as I never before beheld in that locality. The next day there was a great fall of snow; unusually severe weather followed; and our markets were soon stocked with Wildfowl, among which were Shovellers, Pochards, Tufted Ducks, Scaups, Shelldrakes, and immature Golden-eyes, with common Wild Ducks, Widgeon, and Teal in great abundance. A Bittern, and some Slavonian Grebes, one Great Crested Grebe, and one Red-necked Grebe were also obtained. With regard to the Red-necked species, I have often been puzzled with its great variation in size; so much so, indeed, that I have almost been inclined to think there might be two species, or at least races of it. I have also met with specimens like that mentioned by Mr. D'Urban in 'The Zoologist' a short time since, having stripes on the cheeks and neck; but these markings are undoubtedly indicative of immaturity, as in the young of the Great Crested Grebe; yet the examples I have seen so marked happened to be unusually large ones. The bills

of the Red-necked species, too, I find vary considerably both in length and thickness.

Heron and Curlews suffered much from the severe weather in January, many having been brought to the markets. Bramblings and Hawfinches (rare birds in this district), have also visited us, some of the former having been noticed in the middle of the town. Some Stock Doves in the market were obtained in the neighbourhood, and the first, the market people said, they had ever received; they certainly are but rarely met with in this locality, although I am aware that large flocks annually visit the more eastern parts of Devon in November to feed on the beech-mast. Immense quantities of Lapwings were killed; and one fine old male which came under my inspection, having the longest crest I ever saw, had already nearly acquired the black chin and throat of the breeding season. Many Brent Geese and a few Bean Geese made their appearance, and one Wild Swan was killed on the River Yealm, near Plymouth. Woodcocks and Snipe arrived in great abundance, and among the former I examined a very pretty pied variety sent from Cornwall, having a pure white patch on the top of its head, a ring round the neck taking in part of the chest, and white wing-coverts, the bases of the primaries also being tinged with the same; the other parts were of the usual colour, or perhaps a shade lighter, the whole plumage strongly reminding one of that of the Snow Bunting in winter; its legs appeared to have been nearly of the usual tint, with the exception of a pure white claw on one toe of each foot.

Strange to say Fieldfares and Redwings were exceedingly scarce during the heavy fall of snow; hardly any were to be seen in or around the town, although our gardens were swarming with Starlings, Blackbirds, and Thrushes in the most distressed condition; yet, I am happy to add, that notwithstanding hundreds were trapped, shot, and killed in various ways, the sufferings of a great number were greatly alleviated by their being daily and liberally fed by the more humane portion of the population. Missel Thrushes almost entirely disappeared from the neighbourhood, and I remarked that there was not the usual migration of Larks, Starlings, Fieldfares, Thrushes, Redwings, &c., along the coast from east to west, which has particularly attracted my attention in previous years during the first heavy fall of snow. But I think I cannot do better than give a few extracts from

a letter written by my friend Mr. Clogg, of Looe, Cornwall, concerning the starving birds. He says:—"Woodcocks and Snipes were seen in our streets during the severe weather, and Starlings, Larks, Redwings, &c., were constantly to be seen hopping about the streets, looking most miserable. The boys of this place and Polperro are great adepts at bird-catching with bent pins attached to a short string, one end fastened to a peg, which is driven into the ground, the pin baited with a worm. I have this year heard for the first time of five Woodcocks having been taken by that method. I was at Liskeard on New Year's Day, and on visiting the birdstuffer there, I saw a variety of the Common Thrush, bright buff on the back, and all the other parts usually of a much darker colour, with the black spots on the breast replaced by a very pale brown. It was in excellent feather and well mounted. On my visiting the same shop, I believe in September last, I saw a Red-necked Phalarope, which had been shot a week or two before at Dosmare Pool, and was in full winter plumage."

The severe weather had a great effect on the Green Woodpeckers, numbers of which were brought to our birdstuffers; the males in exceedingly fine plumage. A few Common Buzzards and many Long- and Short-eared Owls were also obtained. On January 28th, I examined a fine old Herring Gull, which had already assumed the pure white head and neck of the breeding season, also some adult Waterhens with splendid crimson and yellow bills and red garters. I have not as yet met with any kind of Merganser except a single immature Smew.

On February 1st an adult male Scoter was killed off Mount Batten, in Plymouth Sound, and on the 4th I examined an adult Common Guillemot in perfect breeding plumage. It was probably this early assumption of the nuptial dress which misled Colonel Montagu, and in a great measure tended to confirm him in his belief that the plumage of the Guillemot was the same at all seasons; for, in the Supplement to his 'Ornithological Dictionary,' he writes:—"In the latter end of January, 1805, as cold and severe a winter as for many years had been experienced in the West of England, several of these birds were shot in the estuary of Kingsbridge, some of which we examined, &c. These had the exact plumage of those which frequent our rocks in summer, and in every respect so exactly corresponded with the summer dress of the 'Foolish Guillemot' that it should seem to prove

beyond all doubt that the Lesser Guillemot is perfectly distinct, and that the 'Foolish Guillemot' is at no season differently marked."

Another Red-necked Grebe was obtained, and a pair of Red-breasted Mergansers, the male in full adult plumage, very uncommonly met with in the West of England. I examined the stomach of the male, but could find nothing in it with the exception of a few intestinal worms. Several more Gannets were killed, a few Shovellers, and a second adult male Scoter. I hear that a large flock of Wild Swans was seen at Moorland, in Somersetshire, and my friend, the Rev. G. Robinson, writes from Ireland that Wild Swans have been observed on Lough Neagh, and a Velvet Duck killed in Dublin Bay.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 142.)

BEFORE commencing our observations on genera and species, we wish to draw the attention of our readers to a series of important papers, illustrated with plates, which have appeared in the British Association Reports, by Mr. C. Spence Bate, F.R.S., &c., upon the 'Present State of our Knowledge of the Crustacea.' They are as follows:—Part I., On the Homologies of the Dermal Skeleton, in Report 1875. Part II., the same subject continued, in 1876. Part III., Correlation of Appendages, &c., in 1877. Part IV., On Development, in 1878. Part V., On Fecundation, &c., in 1880. In our first article of this series, at page 98, our remarks upon the 'Manual of Marine Zoology,' by Mr. P. H. Gosse, F.R.S., do not quite fairly describe that work, which treats of the subject of Carcinology to the extent of fifty-seven pages, and includes diagnoses of the class, its orders, suborders, families, genera, with a list of species then known, and figures in most genera. In fact, want of space curtailed our intended eulogy of this most useful work, which is invaluable to the student of our marine fauna.

With regard to arrangement, we propose to follow the classification of M. Milne-Edwards, as used in his 'Histoire Naturelle des Crustacés'; and will deal first with the genus.

STENORHYNCHUS, Lam.

This genus belongs to a wide order, popularly described as "Spiders," though the species in it deserve this title more than those of several allied genera which are nevertheless known by the same name.

In the species of this genus the body is usually about three-quarters of an inch long, roughly triangular in shape, with the lower angles rounded and the forward one continued acutely into a rostrum varying in length in different species. The carapace is symmetrically spinous; the legs long and slender; the rostrum tapering and dual; the abdomen six-jointed; the eyes oval and fixed on a prominent stalk or peduncle and are non-retractile.

"The young of *Stenorhynchus*" (says Mr. Spence Bate, p. 85, Brit. Assoc. Rep., 1869), "is a true zoë, but differs from the typical form in the absence of the great rostral spine, and in the increased length of the great dorsal spine, by a series of latero-dorsal spines on the three posterior somites of the pleon, and in the enormous development of two deciduous spines on the base of the second pair of antennæ."

In the lists of British Crustacea hitherto published, carcinologists have only given two species of this genus as indigenous to Britain, viz., *Stenorhynchus rostratus* (= *phalangium* of Pennant), and *S. longirostris* (= *tenuirostris* of Leach), but we have now the pleasure of adding a third, the *S. ægyptius* of Milne-Edwards. This we shall describe in its place.

Specimens of this genus may be dried rapidly, but carefully, for the cabinet, without dissection. But specimens of all should also be preserved in spirit for careful examination when required, as dried examples are not so well adapted for that purpose.

To explain more fully the points of difference in the rostra and frontal appendages of the three species of the genus *Stenorhynchus*, we have made the sketches, three times larger than life, which appear in each case with the descriptions.

Stenorhynchus rostratus, Linn.

This species answers well to the generic character of the carapace, having it acutely triangular, with rounded lower angles and a short, stout rostrum. Its surface is rounded and spinous, three of the principal spines being in the form of a triangle, with

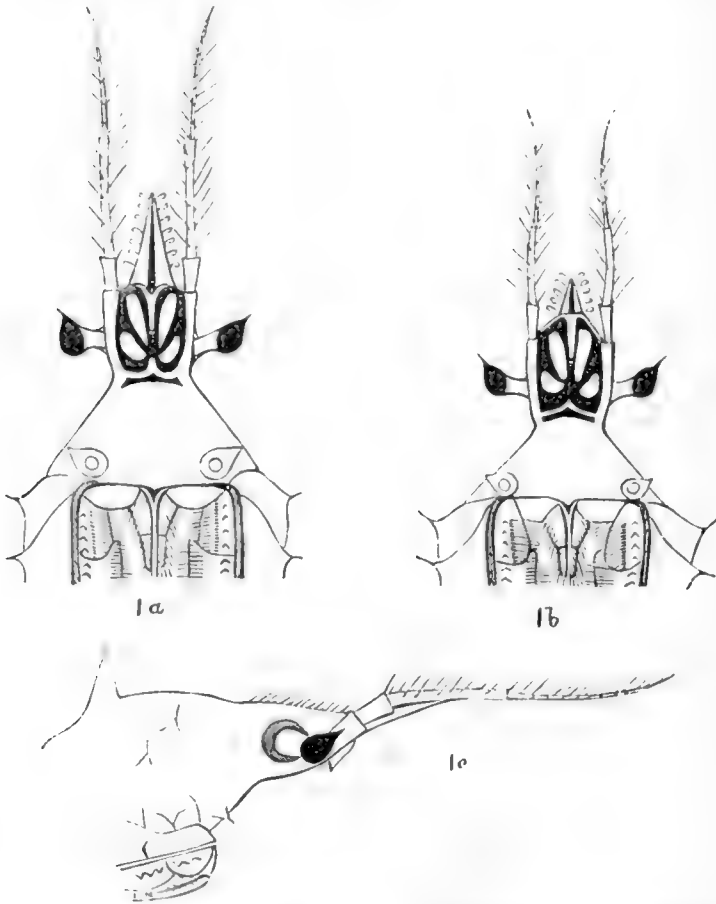


Fig. 1 a. Portion of under side of male *S. rostratus*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 1 b. Same view of female. 1 c. Lateral view of same portion of male.

a fourth midway between the two lower ones. One of the chief characteristics of this species is the absence of the minute spine immediately at the base of the antennæ, on the epistome, which spines are present in both *S. ægyptius* and *S. longirostris*. The rostrum is notched vertically throughout its entire length, and is

hairy and of moderate length, reaching only to the middle of the third joint of the antennæ-stalk. This latter feature is also characteristic, as the rostra of both the following species are longer, and in other features different. The five pairs of legs are very long and slender, the last two pairs having the terminal joint curved like a cat's claw, whilst the preceding two pairs have this joint more simply formed and hairy, like the other joints. The anterior pair are developed into stout arms, terminating in a rather formidable pair of forceps in the male; whilst the corresponding pair of legs of the female are comparatively but slightly developed. From this it would appear that the males of this and many allied species have a requirement, pugilistic or otherwise, which the females have not. The stalked eyes are oval, with a minute spine on their pointed apex. The abdominal segments of the females are broad and roughly pear-shaped, affording great protection to the ova; whilst those of the male are narrower, widening suddenly at the third and fourth somites, and again slightly at the last. A jointed ridge divides these segments equally and vertically.

We have taken ova from this species in the early part of the year. These ova are well concealed by the broad somites of the females, and carried by the swimmerets to which they are attached by semi-elastic, transparent, viscid ligatures, which are extremely slight as compared with those of Crustacea with less abdominal protection. The ova are minute, spherical bodies, of a pale yellow colour when newly extruded, and become granular and darker as the development of the zoeæ proceeds. The first marked indication of the maturity of the enclosed zoeæ is the prominent eyes, which give the eggs a speckled appearance.

This species is much the most commonly met with of the genus, attributable, no doubt, to its habitat being usually shallow water and estuaries of rivers. We have obtained great numbers from the shallower parts of the English Channel and the neighbourhood of the Thames estuary, those from the former locality being very fine and bright. Of the large number of *S. rostratus* examined, we have found very few, and those generally females, covered by fuci, as mentioned by Bell. On the other hand, the species may be characterised as one generally clean and bright. We have noticed most markedly the great predominance of males in catches of this species, as observed by Bell and subsequent writers.

In addition to the Channel and Thames estuary, already mentioned, this species has been recorded, amongst other localities, from St. Andrew's, Shetland (frequent on hard stony ground); Orkney, Guernsey, Dublin Bay, Galway (very common); Belfast, Scarborough, Aberdeen coast, the Hebrides, and South Devon. In 'The Zoologist,' 1877, Mr. Cornish writes that it is not common in Mount's Bay, Cornwall.

Stenorhynchus ægyptius, Milne-Edwards.

This species is described by M. Milne-Edwards as a Mediterranean form, common near the shores of Egypt and Sicily; and is also referred to by Bell in a short foot-note. It is of the same general character as the preceding species, but with several marked distinctions.

The carapace of this species, though broadly resembling *S. rostratus*, is more elongated and graceful; the rostrum is covered with a great quantity of hooked hairs, which distinguish it at once from *S. longirostris*, and it is much longer than that of *S. rostratus*, reaching nearly to the end of the peduncle of the antennæ. M. Milne-Edwards remarks, "Rostre n'atteignant pas tout-à-fait l'extrémité du pédoncule des antennes externes." On the epistome there are two minute spines situated at the base of the antennæ, as in *S. longirostris*, of which Milne-Edwards says, "Epistome armé de chaque côté de deux épines placées l'une au devant de l'autre"; but we have seen specimens in which there were two on one side, and only one at the base on the other side, showing no appearance of being worn away. There are also, as in *S. longirostris*, two small spines on the basal joint of the antennæ, which we have never found in *S. rostratus*. These features are sufficiently defined to mark this species at once, and it is with much pleasure, and with some surprise, that we are able to record this addition to our fauna. The specimens which we obtained were dredged in company with *S. rostratus*, but never with *S. longirostris*, and, as we fortunately obtained a number of specimens, we were enabled to discard entirely the probability of the specimens being varieties of either of the other two species of the genus.

The colour of mature specimens is dirty brown, but we have some half-grown which are of a beautiful pink, striped with yellow. This colour we have never noticed in either of the other

species of this genus. In *S. rostratus* the young specimens are a dirty yellow, while in *S. longirostris* we find them either dirty brown or nearly approaching puce in colour.

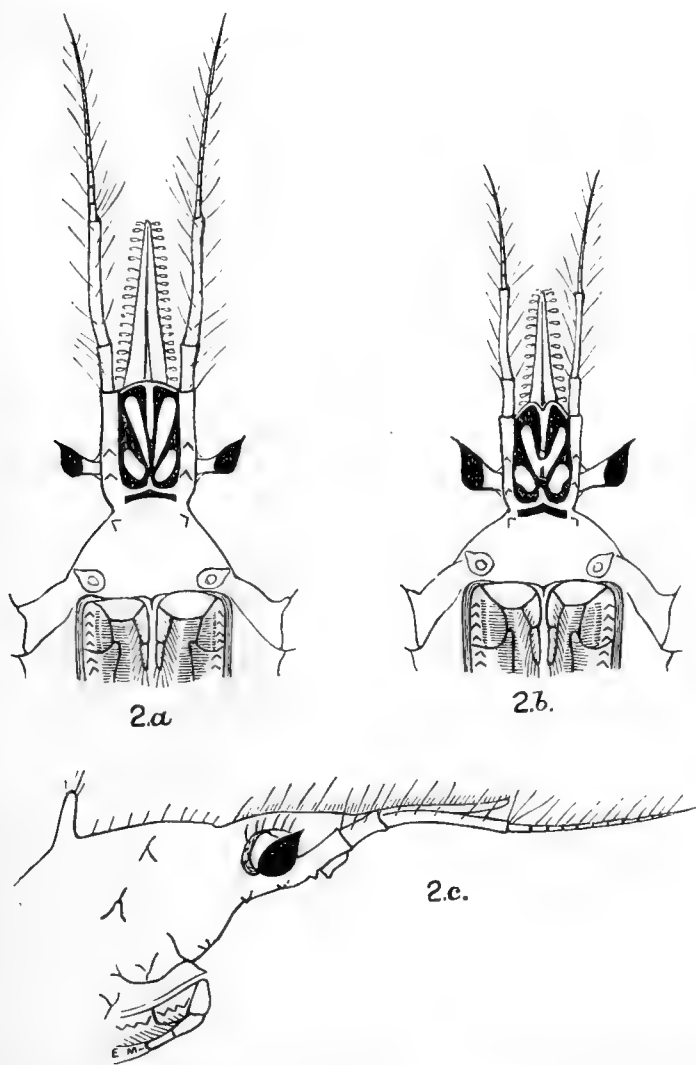


Fig. 2a. Portion of under side of male *S. ægyptius*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 2b. Same view of female. Fig. 2c. Lateral view of same portion of male.

As regards the embryology of this species, we have had as yet no opportunity of making any observations, for, like *S. rostratus*, the larger number of those taken were males; but the females recently obtained (April) are full of immature ova.

The only locality from which we have obtained this interesting species is the English Channel, at a depth of some three to seven fathoms, off the Sussex coast.

Stenorhynchus longirostris, Fabr.

This species may be stated as resembling in general features the two preceding, with the following striking exceptions. The

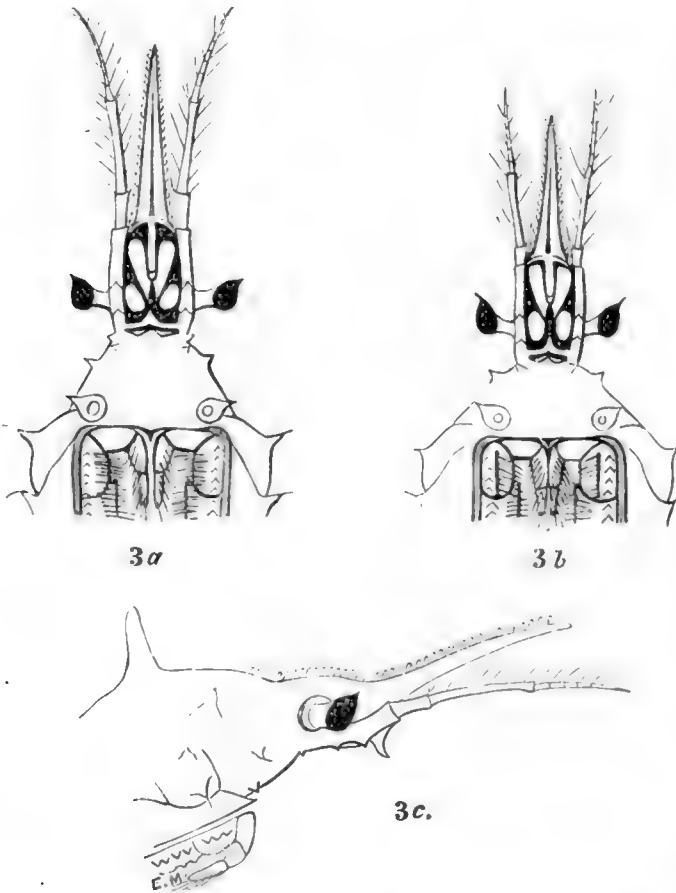


Fig. 3 a. Portion of under side of male *S. longirostris*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 3 b. Same view of female. Fig. 3 c. Lateral view of same portion of male.

rostrum is very long, reaching beyond the antennal stalk, or, to quote Milne-Edwards's description, "Rostre dépassant de beaucoup le pédoncule des antennes externes." It is united throughout its entire length, and is much less hairy than those of *S. rostratus* and *S. egyptius*; it is also pointed upwards, as will be seen in the

figure 3 c, whereas that of the other two are nearly straight and level with the antennæ. In fact, the rostra of the three species are sufficiently distinct and peculiar to characterise them without difficulty.

The spines at the immediate base and also upon the basal joint of the antennæ, is a feature of this species, as it is with *S. ægyptius*. *S. longirostris* also possesses a series of minute spines on the inner portion of the anterior legs or arms, and the spines on the body are more slender, and the body itself altogether more delicately formed than that of *S. ægyptius*.

S. longirostris is a deep-water species, and we have never obtained it from the same "catch" as *S. rostratus* or *ægyptius*, or *vice versâ*, so that it would appear that different species of Crustacea affect different belts, or zones, of depth, and that localities of marine forms are as marked and limited as in the case of terrestrial fauna and flora. We obtained our specimens from fifteen to twenty fathoms.

Besides the English Channel, this species has been taken off our north-east coast; also in the Shetland seas (where it is said to be rare), Aberdeenshire coast (commonly), the Hebrides, and south-west coast of England.

The ova are similar to those of *S. rostratus*, and the time of spawning about the same.

(To be continued.)

OCCASIONAL NOTES.

THE WILD CAT AND THE MARTEN. — The perusal of Mr. Harvie Brown's articles on these two species (pp. 8, 81), has recalled to mind a description of a combat between a Wild Cat and a Marten, which was witnessed many years since in Argyllshire, and which is related in a book published fifty years ago, and now probably little known, 'The British Naturalist; or, Sketches of the more interesting productions of Britain and the surrounding Sea.' No author's name appears on the title-page, but the writer's style seems to indicate that it may have been written by Robert Mudie. The combat above referred to is thus described (p. 54):—"In the year 1805, a gentleman, on whose veracity we can depend, witnessed one of these combats in the Morven district of Argyllshire. In crossing the mountains from Loch Sunart southward he passed along the bank of a

very deep wooded dell, the hollow of which, though it occasionally showed green patches through the trees and coppice, was one hundred and fifty, or about two hundred, feet from the top. The dell is difficult of access, and contains nothing that would compensate for the labour; and thus it is abandoned to wild animals, and amongst others to the Marten, which, though the skin fetches a high price, is not so much hunted there as in more open places, because, though they might succeed in shooting it from the heights above, they could not be sure of recovering the body. Thus it is left to contend with the Mountain Cat for the sovereignty of that particular dell, and both are safe except when they approach the farmhouse at the bottom of the hill. The contest there lasted for more than half an hour, and both combatants were too intent on each other's destruction to shun or fear observation. At last, however, the Marten succeeded in falling upon the right side of the cat's neck, and jerking his long body over her so as to be out of the reach of her claws; when, after a good deal of squeaking and struggling, by which the enemy could not be shaken off, the martial achievements of puss were ended in the field of glory. The victories of the Marten over the Golden Eagle, though there be a tale of one of them at every place where Eagles and Martens are common, are not quite so well authenticated; and Wood-cats, Polecats, and even Weazels, which, though lithe and active enough in their way, are certainly nothing to the Martens, are often the heroes of the tale. It runs uniformly in the same manner:—Down comes the Eagle in the pride of her strength, slash go her talons into the limbs of the Marten, and, with a flap of her wings, she is soaring towards the zenith. The prey, however, is only scotched; and the Marten or the Weasel, or whatever else it may be, jerks round its head into the throat of the Eagle, and both fall lifeless to the earth. These accounts may be true, but they belong to that class of which there is a separate edition for every district, and therefore they would need verification by an eye-witness."—J. E. HARTING.

SQUIRRELS SWIMMING.—Apropos of Col. Godwin-Austin's note (p. 102), I may mention that in the autumn of 1878 I was Salmon-fishing in the River Spey, a few miles from its mouth, where the stream was broad, strong, and deep—when just beyond the end of my line I perceived a Squirrel being carried down, but swimming higher out of the water than is usual with most animals. Its death by drowning seemed inevitable, as the opposite bank was a high, perpendicular cliff of old red sandstone, where even a Squirrel could hardly land. However, it swam gallantly on, heading straight across the stream, and finally, after being swept down a long distance, emerged on the other side, where a burn intersected the rock, and fir-trees grew down to the water's edge. The left bank, where the Squirrel must have entered the river, was low and shelving, and it selected a spot,

accidentally or otherwise, whence the current carried it opposite to an easy landing-place on the right bank.—CECIL DUNCOMBE ('*Nature*,' March 24).

[Observers in the United States report a similar habit in the American Red Squirrel, *Sciurus hudsonius*. Mr. Frederick Hubbard, of New York, writes:—"Some years ago I was rowing on Lake George, in this State, when I observed one of these little animals in an open place, where from the course he was pursuing he must have swum nearly half a mile. He seemed almost exhausted, and when I held my oar towards him he readily accepted the invitation to come on board, ran up the oar, and then to my surprise ran up my arm and ascended to my shoulder! I do not know whether he simply followed his climbing instincts, or whether he sought an elevated point to get an observation. However this may have been, after a short pause he descended and took his station in the bow of the boat, from which in a few minutes he plunged into the lake and struck out for land. He evidently miscalculated his remaining powers, for he was unequal to the effort, and soon gladly availed himself of a second opportunity of gaining a place of refuge. He now sat quietly while I rowed him towards the land, evidently satisfied that he was in friendly hands, and that his wisest plan was to remain as a passenger. When close to the shore he made a flying-leap and scampered for the trees, doubtless grateful in his little heart for the kindness that had helped him over the critical part of his voyage. This was near the narrows of the lake, where it is about one mile in width, with groups of islands which shorten the traverses to less than a quarter of a mile. My little friend, however, had not availed himself of the easier and more circuitous route, but had boldly undertaken a directer course and a longer swim, which, but for the timely rescue, would very likely have been his last aquatic attempt." Another correspondent writes:—"While camping for two summers recently in the wilderness of northern New York, I was much surprised at frequently seeing Squirrels crossing the ponds and lakes of the region. We would sometimes find several of these strange navigators in the course of an afternoon's row. They were seen most abundantly during the early part of July; indeed, later in the season, they were but rarely found. During many summers of camping elsewhere I have never seen them take to the water. It has occurred to me that the explanation of this peculiarity (if it be such) of the Squirrels of this locality may be found in the nature of the region visited; for we find there a most intricate water-system, the whole region being dotted with ponds and lakes connected by small streams. The necessity of taking to the water at times has perhaps enabled the Squirrels to overcome their aversion to this element, and they have thus become semi-aquatic in their habits."—ED.]

PISCIVOROUS HABITS OF THE WATER SHREW.—My nephew and his pupil were recently strolling by the small stream which runs through his

farm, when they were attracted by an exciting performance going on in one of the tiny pools. Approaching cautiously they were surprised to see an excited Water Shrew, *Sorex fodiens*, frantically diving, and after some attempts seize a small chub-headed fish, with all the pluck and ferocity of an Otter poaching in a salmon-stream. The fish after being seized made frantic efforts to escape, but quite unsuccessfully, till the Shrew, perceiving he was watched, let go his hold, the fish instantly sinking to the bottom, and the fierce little animal darting away for some harbour of refuge in the bank. They were much surprised at the performance, more particularly at the length of time the Shrew remained under water.—THOMAS HOPKINS (Limber Grange, Ulceby, Lincolnshire). [Communicated by Mr. Cordeaux.]

FLIGHT OF THE ALBATROSS.—When watching the Albatross one is struck with the fact that the bird gets up to windward without appearing to use his wings to a degree sufficient to account for the same. The sailors are satisfied with the explanation that he beats to windward. The conditions are of course not analogous to those of a ship sailing to windward. If the wind be very light, or if there be a calm, occasional powerful and obvious flapping of the wings occurs. If there is no wind, the birds often settle on the water round the ship. In very heavy weather the birds disappear altogether, probably settling on the water. Except that for breeding they resort to the islands, I believe they frequent the open ocean, where the surface is seldom without more or less swell. On watching the flight of the Albatross one observes that, in order to rise from the water, violent and obvious flapping of the wings is necessary, which is continued some time after the wings cease to strike the water. After a start has thus been effected, if there is a fresh breeze, the wings are kept almost motionless. Sometimes the bird goes some distance with the impetus derived from the flapping of the wings at the start, but sooner or later he turns so as to expose the plane surface of his wings full to the force of the wind, rising at the same time some height above the water, and drifts off to leeward, thus soon acquiring the velocity of the wind: then swooping down into the hollow between two swells, he turns his head to windward, and, keeping close to the surface of the water, sails along more or less against the wind for a surprising distance; finally, rising over the crest of a wave comparatively high into the air, and turning with his wings as before, so as to catch the wind to the fullest extent, he again lets himself drift off to leeward. Thus the manœuvre he performs seems to consist in drifting with the wind in such a way as to attain its velocity very soon, and then turning round so as to make use of this velocity to carry him in the contrary direction. Of course if he still remained exposed to the wind which had imparted to him its velocity he would not travel far against it before he came

to a standstill, and he would certainly make no progress to windward; but by keeping close to the surface of the water, and as much as possible in the hollows between the waves, he is almost out of the wind; and in this comparatively calm region the impetus derived from the wind will carry him a long distance in exactly the opposite direction to that of the wind itself. This manœuvre appears to be an important factor. No doubt the almost imperceptible movement of the wings may assist, though that this alone is insufficient to account for the progress to windward appears evident from the powerful efforts made with the wings in rising from the water and in calm weather. I have never had an opportunity to observe the Albatross flying over land or over level water. If the manœuvre above described be an important factor, the birds then would have to use their wings much as they do in very light winds on the ocean. If very strong winds were blowing, they would have to settle on the land or in the water in order to remain at the locality.—ARTHUR W. BATEMAN, in '*Nature*.'

FLIGHT OF THE ALBATROSS.—There seems to be a prevailing idea that the Albatross in its flight is in some way "assisted by the wind." I think this is a mistake; the manner is well known. The method, I believe, admits of a very simple explanation. His secret consists in his power of acquiring great momentum together with the large superficial area of his extended wings; with scarcely a motion of his wings he will fly straight against a strong wind with a velocity greater than that of any race-horse: this is inconsistent with the idea of his being "assisted by the wind." In attempting to rise from the water (I believe he is unable to rise from the land or from a ship's deck) he flaps his wings violently to get his body out of the water; at the same time, paddling rapidly with his webbed feet, he acquires a moderate degree of momentum, sufficient, with outstretched wings, to carry him forward and upward upon an easy incline. The case is similar to that of a boy taking a run with his kite-string in his hand to give his kite a start. During this first rise he will generally give a few heavy, lazy flaps, and then stretch his wings steadily to their full extent; now, as he gradually rises, he must of course as gradually lose his acquired momentum till it suits him to acquire more, when he may be twenty, thirty, or fifty feet above the surface, but a much greater distance from the place where he left the water, measured on the surface; by slightly altering his position, by a movement of his tail, he takes a shoot downwards at an angle that suits his convenience, still without his wings outstretched. This is precisely the case of a boy shooting down a coast on his sled; the propelling force is the same. The bird directs his course mainly with his tail, the action of which upon the air is identical with the action of a ship's rudder upon the water. By this downward motion, his velocity rapidly increasing, he acquires a degree of momentum sufficient

to carry him up again to a height equal to or greater than that from which he started. In this up and down long wave-like motion, with all its variations on either side, consists the whole of his flight day after day for hundreds of miles ; at long irregular intervals he may give a few lazy flaps with his immense wings. Other birds use the mode of flight of the Albatross, but to a smaller extent, for the reason, in the case of smaller birds, that, the ratio of feathers to bulk being greater, their specific gravity is less, consequently they are unable to acquire the degree of momentum necessary to carry them upward ; but on the other hand they have the power of sustained effort in moving their wings rapidly, which the Albatross has not. Gravitation then, which prevents him from rising directly on the wing, is the motive power of the Albatross when aloft. He must always take a run or paddle over the surface of the water in order to get a start, and on the land or the deck he is a prisoner, because he has no water in which to paddle himself along with his webbed feet, and he is unable to run. Instead of being assisted by the wind, his speed is lessened by just so much as the wind's velocity, when it happens that the direction of the wind and his intended course are opposed to each other, but with the wind his speed is just so much greater than it would be in a calm. I do not advance this explanation as an imaginative theory. I claim more for it. I have had many opportunities of studying the movements of the Albatross for consecutive days, and I feel confident that the above will be found to answer all required conditions. — HOWARD SARGENT (Cambridge, U.S.), in '*Nature*.'

WINTER BIRDS NEAR REIGATE, SURREY.—The following are a few brief notes from Gatton, in Surrey, which may perhaps be of interest to readers of '*The Zoologist*,' although not containing anything very important. On New Year's Day I saw a Hawfinch, the first I have observed at Gatton. It was near a fine yew,—one of a line said to have extended in bygone days to the pilgrims' shrine at Canterbury,—but which in this berryless season had no provision of fruit on it. On January 5th I saw two drake Pochards on the lake. On the 12th the weather suddenly changed, sharp frost set in, and a large flock of Redwings made their appearance ; the Waterhens showed signs of uneasiness, and the Wood Pigeons, which had hitherto been in great flocks, began to go. On the 13th there were twenty-seven Wild Ducks on the lake, and Wild Geese were heard passing over. On the 14th it was all frozen, and an ornithological scene presented itself. In the middle forty-three Coots huddled together on the ice, while in a little hole which had been kept open for the Swans four Little Grebes were bobbing up and down. On the 15th we had over 20°, and the whole lake bore. The number of ducks had increased to thirty, while the Coots dashed wildly about at the approach of

the skaters, seeking open water where there was none. The Dabchick's hole was frozen; two were gone; the other two were squatting helplessly on the ice. I chased them into the reeds and caught one of them. Placed in a large glass-bowl it proved a most amusing diver, but as I had no minnows to feed it on, I sent it to the Zoological Gardens, where it soon died in the Fish-house. Its shyness was extreme, and it would often dive with such a quick start as to throw sprays of water seven or eight feet. In this respect it was very unlike a Slavonian Grebe which was caught on the shore near Cromer on the 27th, and taken alive to my father's, where it was put into a bath with plenty of water, and which, either from exhaustion or a contented disposition, was as tame as the other bird was wild. The late Mr. Gould, in his 'Birds of Great Britain,' represents the inner circle of the eye of the Slavonian Grebe as white, as do several other authorities, but in our bird, when alive, it was golden yellow. The Hawfinch turned up again at Gatton on the 11th February, apparently after the crumbs which had been put out to feed the small birds, as it approached close to the window. I remember, when at school at Braconash, in Norfolk, a Hawfinch which came very close to the window while the boys were at breakfast. Yet in nearly all works on Ornithology the Hawfinch is rightly accredited with being one of the shyest of birds. On the 26th, on going down to the lake, I immediately discovered a stranger, which was soon identified as a female Goosander. 1880 has been quite a winter for this species and the Smew. It was very agile and beautiful when swimming with one or two Coots abreast on either side of it, but looked droll enough squatting among some dead reeds by the side of the lake. I heard of it long after my departure, and believe that it remained there until April.—J. H. GURNEY, Jun. (Northrepps, Norwich).

ROUGH-LEGGED BUZZARD AND HEN HARRIER IN SURREY.—Last month I announced the capture of the Rough-legged Buzzard in Surrey, and stated in my note that I was informed the male bird had been trapped a short time previously. Since writing I have seen the supposed male, and find it to be the male of the Hen Harrier, the companion to which was trapped by Mr. Lambert's keeper in the same neighbourhood a short time since. I have now seen all three birds, and they are a female Rough-legged Buzzard and a pair of Hen Harriers, birds of the year, all trapped during the past winter in the neighbourhood of Chelsham, Surrey.—PHILIP CROWLEY (Waddon House, Croydon).

ORNITHOLOGICAL NOTES FROM OXFORDSHIRE. — Early in December last a Shag was shot whilst sitting on the ridge of a barn roof at Souldern. A female Goldeneye was procured on the canal on the 18th January, and on the 24th of the same month a Grey Crow was picked up near Banbury in a starving condition and brought to Mr. Wyatt, the Banbury birdstuffer,

who kept it for some days, and then let it go. This bird is usually rather rare here, but this autumn I have heard of three specimens having been killed. On the 5th inst. I put up three Short-eared Owls from some long grass in a wet, marshy meadow. About the end of the frost Mr. Wyatt had no less than ten Green Woodpeckers brought in, besides three Hawfinches and other birds—all picked up dead, and very thin and poor. Kingfishers have also suffered very much; a great many were found in the Cherwell when the ice broke up. Bramblings shot about the same time were in very good condition.—OLIVER V. APLIN (Bodicote, near Banbury).

“HUMMING” OF THE SNIPE.—With reference to the article on this subject in the last number of ‘The Zoologist,’ I beg to suggest, in accordance with a note I find in ‘The Zoologist’ for 1846 (p. 1501), that the Snipe, in the breeding season, may emit *two* sounds, one with the wings and tail, *i.e.* “drumming” or “humming,” and one, called “bleating” or “whorring,” emitted when the bird is on the ground, but how emitted I will not venture to say. This suggestion, if it prove correct,—and I leave it to abler persons than myself to prove or disprove it,—would reconcile the conflicting views of Dr. Altum and Herr Zöppritz, and the evidence they produce in support of their respective theories. The writer of the note above referred to says that he has heard the Snipe emit the sound, above referred to as “bleating” or “whorring,” when he has been close enough to see that the sound was unaccompanied by any motion of the wings.—LIONEL P. FISHER (Harrow).

PECULIAR NESTING OF THE BLACKBIRD.—About four or five years ago, when I was staying at Chalbury, Wimborne, Dorset, on the 22nd of June, as I and a friend were walking in a field which was put up for hay, my attention was suddenly called to a bird's nest built on the ground, with three fine young birds in it, just fledged, which turned out to be a Blackbird's. The nest was situated in an open space, a long way from any hedge, and was composed principally of small twigs, roots, and mud, lined with bents of grass. I think this is rather a rare case. I have found five instances mentioned in ‘The Zoologist’ for 1873, some of which nests were built at the butts of trees in a wood, and some on hedge-banks, but I do not think there was one in an open field.—H. C. WARRY (Pembroke College, Cambridge).

TEAL NESTING IN YORKSHIRE.—On April 18th a nest and eggs of the Teal were found on Strensall Common, near York, a former breeding-place of this bird. The nest, on which the bird sat very close, was placed at the side of a clump of heather, some distance from water, the sides being slightly raised, with a small depression in the middle, and was constructed of dead grass with feathers intermixed, and not (as stated by the Rev. F. O.

Morris) "lined thickly with feathers." It contained twelve eggs quite fresh.—W. HEWETT (26, Clarence Street, York).

LITTLE EGRET IN YORKSHIRE.—Allow me to record the occurrence of the Little Egret, *Ardea garzetta*, which was shot on January 4th, 1881, near Haybourn Wyke, four or five miles north of this town, and is now in the possession of Mr. Thompson, a bird-preserver at Scarborough. The specimen is in very fair plumage, but is deficient of the long feathers which form part of the occipital plume.—ROBERT P. HARPER (2, Royal Crescent, Scarborough).

LATE APPEARANCE OF THE GREAT GREY SHRIKE IN PERTSHIRE.—A specimen of this species, a female, was shot by my gamekeeper here on March 19th, in a small piece of cover. It was in fine plumage. This seems a very late period for its occurrence. The stomach contained the remains of a Blue Tit.—JOHN J. DALGLEISH (Brankston Grange, Culross, Perthshire).

CRANE AT SCILLY.—A Crane, *Grus cinerea*, has been forwarded to me from Scilly, and is being preserved for the Lord Proprietor of the Islands. It is an adult female, the ovary containing eggs about the size of a pea.—W. H. VINGOE (Penzance).

SALMON AT SEA.—In May, 1880, the nets of the driver 'Wanderer' of Mousehole, Richard Pentreath, master, fishing fourteen miles north-west of the Scilly Islands, took a Salmon of twenty-seven pounds weight, in excellent condition. There was no fresh-water course worthy of the name of even a small river within one hundred miles of the place where the capture occurred. In the week afterwards on the same ground the nets of the driver 'Thetis' took a Salmon of twenty-eight pounds and a half, in such good condition that it sold on the quay at Scilly to the buyers for London by auction for £3 0s. 9d.—THOMAS CORNISH (Penzance).

THE SWIMMING-BLADDER OF FISHES.—In a note to the Paris Academy, Prof. Marangoni gives the results he has arrived at in a study of the swimming-bladder. He states, first, that it is the organ which regulates the migration of fishes, those fishes that are without it not migrating from bottoms of little depth, where they find tepid water; while fishes which have a bladder are such as live in deep, cold water, and migrate to deposit their ova in warmer water near the surface. Next, fishes do not rise like the Cartesian diver (in the well-known experiment), and they have to counteract the influence of their swimming-bladder with their fins. If some small dead and living fishes be put in a vessel three-

quarters full of water and the air be compressed or rarefied, one finds in the former case that the dead fish descend, while the living ones rise, head in advance, to the surface. Rarefying has the opposite effect. Fishes have reason to fear the passive influence due to hydrostatic pressure; when fished from a great depth, their bladder is often found to be ruptured. Thirdly, the swimming-bladder produces in fishes twofold instability, one of level, the other of position. A fish, having once adapted its bladder to live at a certain depth, may, through the slightest variation of pressure, be either forced downwards or upwards, and thus they are in unstable equilibrium as to level. As to position, the bladder being in the ventral region, the centre of gravity is above the centre of pressure, so that fishes are always threatened with inversion; and, indeed, they take the inverted position when dead or dying. This double instability forces fishes to a continual gymnastic movement, and doubtless helps to render them strong and agile. The most agile of terrestrial animals are also those which have least stability.

UNUSUAL WEIGHT OF A CRAB.—On April 9th a very large Crab was brought to my house that I might see it, but I was unfortunately from home at the time. I have to-day (April 11th) seen the man who brought it to me, and whom I know to be respectable and trustworthy, and he tells me it was taken in a trawl, and was weighed on board the trawler in his presence, and that it turned the scale at sixteen pounds avoirdupois weight. I write this with the reservation that I believe it to be true, but that I cannot vouch for it to my own knowledge. It is four pounds heavier than the heaviest I ever saw.—THOMAS CORNISH (Penzance).

[Mr. Carrington informs us that the largest Crab he ever heard of was a Norwegian one, and weighed eleven pounds. Bell, in his 'History of British Stalk-eyed Crustacea,' states that a weight of twelve pounds is occasionally attained.—ED.]

POISONOUS QUALITIES OF THE STAR-FISH.—On February 18th I picked up, on the shore here, a fine specimen of the Sun-star (*Solaster papposa*), which I took home and laid on my study fender to dry. On the 20th, during my absence from the room, two favourite cats of mine came in and ate the Starfish. They were discovered almost in the act, and nothing was thought of it at the moment. In about ten minutes, however, the smaller cat, which was about half-grown, was violently sick, and in less than a quarter of an hour was dead. Soon after, the other cat, which was full-grown, suddenly began to scream piteously, and was also sick. It soon became unable to walk or stand, and died (about two hours after eating the

Starfish), in violent convulsions. On examination I found the stomach empty, save for a few minute fragments of the shelly matter of the Sun-star. There was no trace of irritation of the stomach, the poison being apparently of the cerebro-spinal type. This case seems to corroborate the theory that Starfish kill bivalves by injecting poison between the lips of their shells.—CHARLES A. PARKER (Gosforth, Carnforth).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

March 1, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary exhibited the cast integument of a large Spider (*Mygale bistrata*?) which had been shed in the Society's Gardens.

Mr. G. E. Dobson read a paper on the anatomy of the family *Erinaceidæ*, commencing with that of the curious and rare form *Gymnura Rafflesii*, with which the species of *Erinaceus* were compared. *Gymnura* was shown to be a peculiarly central form, the survivor probably of a once widely-spread group. Altogether, the anatomy of thirteen species of *Erinaceidæ* was treated of in this paper.

A communication was read from Mr. F. Moore, containing descriptions of some new genera and species of Asiatic Nocturnal Lepidoptera. The characters of 150 new species were given representing eighty-two genera, of which twenty-nine were new to science.

A communication was read from Mr. R. Collett, containing an account of the breeding habits of the Grey Seal, as observed on the Fro Islands, off Trondhjem's Fiord, in Norway.

Mr. R. Bowdler Sharpe read a note on the Fantail Flycatcher of Western Australia, *Rhipidura preissi*, of which he had lately had, for the first time, an opportunity of examining a specimen.

March 15, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called special attention to a female Bactrian Camel, *Camelus bactrianus*, formerly belonging to Ayoub Khan, which Colonel O. H. St. John, had purchased from its captors at Kandahar and presented to the Society; and to a male Wild Sheep, *Ovis cycloceros*, obtained from Afghanistan, and presented to the Society by Capt. W. Cotton.

Mr. A. G. More exhibited some eggs of the Red-necked Phalarope, believed to have been taken in England; and an egg of the Tree Pipit, taken near Dublin, this bird having been considered only doubtfully Irish. Mr. More also exhibited a specimen of the Red-crested Pochard, obtained near Tralee, being the first record of the occurrence of this species in Ireland. [See p. 143.]

Mr. R. Bowdler Sharpe exhibited a specimen of the so-called Sabine's Snipe, *Gallinago Sabinii*. This bird had been shot in July last by the Hon. W. W. Palmer at Wolmer Pond, near Selborne, Hants.

Prof. F. Jeffrey Bell read the fourth of his series of observations on the characters of the Echinoidea. The present paper dealt with most of the genera of the *Echinometridæ*; their systematic affinities were discussed and their relations to the *Echinidæ* shown to be so intimate as not to justify their separation into two distinct families.

A second paper by Prof. Bell gave the description of a new species of the genus *Mespilia*, obtained at Samoa by the Rev. S. J. Whitmee, which the author proposed to name after its discoverer, *M. Whitmei*.

Mr. W. A. Forbes read the fourth of his series of papers on the anatomy of Passerine Birds. The present communication was devoted to the consideration of some points in the anatomy of the genus *Conopophaga* and of its systematic position.

A communication was read from Prof. Newton, in which he proposed to substitute the name *Hypositta* for *Hypherpes*, which he had formerly proposed for a genus of Passerine birds found in Madagascar.

A communication was read from Mr. M. Jacoby containing descriptions of new genera and species of Phytophagous Coleoptera.

April 5, 1881.—Prof. H. W. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of March, and called special attention to a young male Goral Antelope, *Nemorhædus goral*, from the Himalayas, being the first example of this fine species that had been received; and to three Birds of Paradise belonging to the following species, deposited on approval:—the Twelve-wired Bird of Paradise, *Seleucides alba*; the Red Bird of Paradise, *Paradisea sanguinea*; and the Green Manucode, *Manucodia chalybeia*. The Secretary added a record of the weights and measurements of the four Indian Elephants now in the Society's Gardens.

Mr. Sclater exhibited five birds' skins obtained by the Rev. G. Brown on the island of Rotumeh, and presented by him to the 'Challenger' Expedition. Mr. Sclater also exhibited specimens of two new species of birds from New Britain, belonging to the Museum Godeffroi, which he proposed to call *Trichoglossus rufigularis* and *Ortygocichla rubiginosa*.

Mr. H. E. Dresser exhibited and made remarks on a specimen of *Saxicola deserti*, killed in Scotland [see p. 146], and a specimen of *Picus pubescens*, believed to have been killed in Normandy.

Mr. W. A. Forbes read some notes on the external characters and anatomy of the Californian Sea Lion, *Otaria Gillespii*, and exhibited some coloured drawings of this animal.

Prof. Flower read a note upon the habits of the Manatee, chiefly in reference to the question as to whether this animal had the power of voluntarily leaving the water for the purpose of feeding on the herbage of the banks, as stated by many authors, and as supported by a communication from the late Mr. R. B. Dobree, notwithstanding which Prof. Flower considered the evidence upon which the statement was based to be very unsatisfactory.

A paper was read upon the same animal by Miss Agnes Crane, consisting of observations upon the Manatees lately living in the Brighton Aquarium.

Dr. A. Günther read an account of the Amphibæniæ and Ophidiæ collected by Prof. Bayley Balfour in the island of Socotra. A new form of Snake allied to *Tachymenis* was named *Dityrophis vivax*, a new species of *Zamenis* was named *Z. Socotræ*, and a new form of Amphibæniæ, *Pachycalamus brevis*.

Mr. W. T. Blanford gave an account of six species of Lizards which had been collected by Prof. Bayley Balfour in Socotra; of these the three following appeared to be undescribed:—*Hemidactylus homæolepis*, *Pristurus insignis*, and *Eremias Balfouri*.

Mr. Charles O. Waterhouse read a paper on the Coleopterous insects which had been collected by Prof. Bayley Balfour in Socotra. The number of species of which examples were collected was twenty-four, and showed that the fauna of Socotra, judging from this collection, was distinctly African. Twelve of the species appeared to be new.

A communication was read from Prof. J. O. Westwood containing observations on two species of Indian butterflies, *Papilio castor* and *P. pollux*.

A communication was read from Mr. Edgar A. Smith, containing some observations on the shells belonging to the genus *Gouldia* of C. B. Adams.

Mr. Sclater read the fifth of his series of notes on the birds of the vicinity of Lima, Peru, with remarks on their habits by Prof. Nation. A new species of *Buarremon*, of which an example was in the collection, was proposed to be dedicated to its discoverer as *B. Nationi*.

Mr. G. E. Dobson read some notes on certain points in the muscular anatomy of the Green Monkey, *Cercopithecus callithrix*.—P. L. SCLATER, Secretary.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 2, 1881.—H. T. STAINTON, Esq., F.R.S., &c., President, in the chair.

Mr. H. Bedford Pim (Leaside, Kingswood Road, Upper Norwood, S.E.), was balloted for and elected an Ordinary Member of the Society.

Mr. E. A. Fitch, on behalf of Mr. A. S. Olliff, who was present as a visitor, exhibited a specimen of *Strangalia quadrifasciata*. This Longicorn was captured at West Wickham last August while flying round thistle-heads in the sunshine.

Mr. W. C. Boyd exhibited a specimen of *Nonagria lutosa* captured outside the Great Eastern Railway terminus in Liverpool Street; also a curious variety of *Ennomos tiliaria*, taken at light at Cheshunt.

Mr. W. F. Kirby called the attention of Members to a work on all Orders of Insects by Herr Buchecker, of Munich, which was now in course of publication, and exhibited some parts representing the Neuroptera and Lepidoptera. Mr. M'Lachlan said he could by no means recommend this work to the notice of the members, as in his opinion the author was much more of a photographer than an entomologist, consequently little new information was to be obtained, but much that was erroneous and misleading; the photographic plates were fairly good and accurate.

Mr. F. P. Pascoe read a paper "On the genus *Hilipus* and its Neotropical allies," in which about fifty species were described, all of which were exhibited.

Mr. W. L. Distant read "Descriptions of new genera and species of Rhynchota from Madagascar."

Prof. Westwood communicated a paper entitled "Observations on the Hymenopterous genus *Scleroderma* and some other allied groups."

Mr. M'Lachlan directed the attention of Members to a paper by Dr. Adler, just published in the last part of Siebold and Kölliker's 'Zeitschrift' (Zeit. für wiss. Zoologie, vol. xxxv., pp. 151—246, pl. x.—xii.) on the dimorphism of oak gall-flies (*Cynipidæ*).

The Secretary read a report, from the 'Western Daily Mercury,' of the proceedings of the Yealmpton (South Devon) Police Court on the 8th of February last, when H. W. Horton, a farmer, was convicted under the Destructive Insects Act of 1877, of being in possession of living specimens of the Colorado Beetle, and was fined £5. The Secretary also read a trenchant leading article from a later issue (February 12th) of the same paper.

Mr. Jenner Weir remarked that he had recently seen a living specimen of the *Doryphora* which had been brought to London in a barrel of potatoes.

April 6, 1881.—W. L. DISTANT, Esq., M.A.I., Vice-President, in the chair.

Dr. Victor Signoret (46, Rue de Rennes, Place St. Germain-des-Prés, Paris), was unanimously elected an Honorary Member, in the place of M. Achille Guenée, recently deceased.

Dr. G. W. Royston Pigott, M.A., M.D., F.R.S., F.R.A.S., &c. (Annan-dale, Eastbourne, Sussex), was balloted for and elected an Ordinary Member of the Society.

Mr. J. Jenner Weir exhibited a beautiful specimen of a *Noctua* found at rest in a nursery-garden at Blackheath, in August last. It was apparently a new species, and there was some difference of opinion among the members as to whether it came near to the genus *Dicycla* or *Gortyna*.

Mr. R. M'Lachlan exhibited three species of the genus *Dilar*, Rambur, one of the rarest genera of Neuroptera-Planipennia. They represented *D. nevadensis*, Rambur, from Spain (the typical species), *D. Hornei*, M'Lach., from North-West India, and *D. Prestoni*, M'Lach., from Rio Janeiro; thus the genus, although numbering very few species, and of a strongly characterized nature, is widely distributed. Mr. M'Lachlan alluded especially to the singular unilaterally pectinate antennæ of the males and the long thread-like ovipositor of the females; this latter indicating some special habit yet to be discovered.

The Rev. A. E. Eaton exhibited, as a microscopic preparation, a specimen of *Haplophthalmus elegans*, Schöbl., a woodlouse new to the British fauna. Two specimens were found in a garden at Croydon.

Miss E. A. Ormerod exhibited two *Termites* nests, forwarded to her by Mr. Everard im-Thurn, from British Guiana. One nest was nearly spherical in shape, being about two feet six inches in circumference, and encircled the small branch of a tree; in structure it consisted of a number of irregular chambers or passages, the walls of which were composed of a blackish granular substance from gnawed wood; these nests were also stated to be very hard and ligenous towards their centre. Miss Ormerod said that in the packing-case in which this specimen was received there was a great quantity of blackish sawdust, apparently from the injured outer covering, part of which still remained, and somewhat resembled rough brown paper. Mr. im-Thurn had expressed his fears that "the thin black crust" of the nest would suffer in transit. A large number of the *Termites* from this nest were exhibited, consisting of two apterous forms, but mostly "soldiers." The nest now exhibited was said to be a small specimen of its kind, as they were very frequently found of from six to eight feet in circumference. The other nest was of the general Termite nature, being of hard clay and showing the usual irregular chambers, but these particular ground-nests were stated to be very rarely, if ever, of large size.

Mr. F. P. Pascoe remarked that many years ago he had found a similar tree-nest in a forest in the Organ Mountains in Brazil, but did not at the time examine it; he learnt, however, that it was known there as the "negro-head," a name very suggestive of its appearance. The year before last he had met with a somewhat similar nest near Pará, but larger and of a lighter colour. They were both attached to trees, five or six feet from the ground, not to branches. The Pará nest was very friable, and on breaking into it scores of the "rostrate" workers rushed out (some of which, with portions of their nest, were exhibited). These workers have a very large head conically produced to a sharp point in front, the mouth underneath; and they are without eyes.

Mr. M'Lachlan regretted that no winged *Termes* had been exhibited or procured, since without the winged insects it was almost impossible to determine the species with certainty. The specimens obtained from the tree-nest, exhibited by Miss Ormerod, represented two forms of workers, viz., the ordinary condition and a form occurring in many species of *Termitidæ*, known as nasute or horned workers ("Arbeiter nasuti"). It was a small species, and evidently allied to that exhibited by Mr. Pascoe, which was probably *Termes opacus*, Hagen. In Hagen's "Monographie der Termiten" (Linnæa Entomologica, vol. x.), much information was given in a collective form on the habits of these insects; further interesting observations are to be found in Dr. Fritz Müller's paper "Beiträge zur Kenntniss der Termiten," published in the 'Jenaische Zeitschrift für Medicin und Naturwissenschaft,' vol. vii., and in notes by Mr. H. G. Hubbard "On the Tree-nests of *Termites* in Jamaica" that appeared in the 'Proceedings of the Boston Society of Natural History,' vol. xix.

Mr. T. R. Billups exhibited a specimen of the rare *Ichneumon erythræus*, Gr., taken at Headley Lane, Surrey, in March last, remarking that the British Museum collection contained but two examples of this species. Also a specimen of *Lasiosomus enervis*, H.-Sch.,—a rare British Hemipteron,—which he captured at Weybridge on the 9th March last.

The Secretary announced the death of Herr J. H. C. Kawall, at the age of eighty-two, on the 29th January last, at Pussen, near Windau (Kurland, Russia), of which village he had been pastor fifty-one years. Kawall was a general entomologist, but especially studied the Hymenoptera.

Mr. R. M'Lachlan read the "Description of a new species of *Corduliina* (*Gomphomacromia fallax*) from Ecuador."

Mr. J. B. Bridgman communicated a paper entitled "Some additions to Mr. Marshall's Catalogue of British *Ichneumonidæ*," in which upwards of sixty species were introduced as new to the British fauna, thirteen being described as new to science. Mr. Billups and Mr. Fitch exhibited most of the specimens referred to.—E. A. FITCH, *Secretary*.

NOTICES OF NEW BOOKS.

An Introduction to the Study of Fishes. By ALBERT C. L. GÜNTHER, M.A., M.D., F.R.S., Keeper of the Zoological Department in the British Museum. 8vo, pp. 706, with numerous illustrations. Edinburgh: Black. 1880.

OF the many hundred volumes which have been published in English on Fish and Fishing, it is singular how very few treat of Ichthyology, in the strict sense of the term, that is to say, the internal and external structure of fishes; their mode of life, and their distribution in space and time. Some idea of the number of such treatises may be obtained by a glance at the catalogues of the literature of the subject which have from time to time appeared; notably Sir Henry Ellis's Catalogue published in the 'British Bibliography,' and reprinted (though without acknowledgment) in the Supplement to Daniel's 'Rural Sports,' Pickering's 'Bibliographia Piscatoria,' and the Catalogues of Messrs. Russell Smith (1856) and Westwood (1857). Incomplete as these are, they nevertheless serve to indicate the nature of the books on Fishes which have been put forth by English writers since the appearance of the earliest 'Treatyse of fysshynge wyth an angle,' in 1496. With but few exceptions, these works for the most part relate to the various methods and devices for capturing fish, with indications, more or less brief, of the situations in which they may be found. Now and again, in such works as those of Izaak Walton and Sir Humphrey Davy, we find some excellent remarks on the habits of fish, evidently written from personal observation; while the more scientific volumes of Yarrell and Couch furnish valuable materials for a natural history of the Fishes of the British Islands. But none of these writers have gone far enough; the limits of their respective works are too narrow; the reader gains from them no knowledge of the elements of Ichthyology, no idea of general classification, and is left in ignorance on many points of interest and importance, such as the internal structure, the organs of respiration, circulation, nutrition, and reproduction, the organs of sense, and the geographical distribution of fishes.

Thus, a work like that which Dr. Günther has now produced has long been a desideratum with zoologists. Its object, as defined by the author in his Preface, is "to give, in a concise form, an account of the principal facts relating to the structure, classification, and life-history of fishes; to meet the requirements of those who are desirous of studying the elements of Ichthyology; to serve as a work of reference to zoologists generally; and finally to supply those who, like travellers, have frequent opportunities of observing fishes, with a ready means of obtaining information."

Dealing first with the history and literature of Ichthyology, Dr. Günther passes in review the various naturalists of note who have written on the subject from the time of Aristotle down to the present day, and notices their principal works, and the system of classification proposed or adopted by each. The first chapter concludes with a useful catalogue of "Voyages containing general accounts of zoological collections," a list of Fish-faunas, and a list of works relating to the anatomy of Fishes.

In the list of Fish-faunas we observe that, under the head of "Great Britain," Dr. Günther has quoted only three writers on British Ichthyology, namely, Parnell (author of a 'Natural History of the Fishes of the Firth of Forth'), Yarrell, and Couch. We should have thought that he might also have added the names of Pennant, Fleming, and Jenyns, as systematic writers on British Fishes; while Thompson's 'Fishes of Ireland,' and the two volumes on British Fishes in Jardine's 'Naturalists' Library,' seem to us also worthy to be included in a list of faunal publications relating to Great Britain.

In Chapters II.—IV. we have a description of the external and internal structure of fishes, and succeeding chapters deal with their myology, neurology, and the various organs of sense, nutrition, respiration, circulation, and reproduction.

The author's remarks on the growth and variation of Fishes (Chap. XIII.) are very instructive. In young fishes, it seems, the eyes are constantly larger than in adult relatively to the size of the head; and again the head is large relatively to that of the body. Changes amounting to metamorphosis have been hitherto observed only in *Petromyzon*. One of the most extraordinary changes by which, during growth, the form and position of several important organs are effected, occurs in Flat-fishes (*Pleuronectidæ*). Their young are symmetrically formed, with a

symmetrical mouth, and with one eye on each side; they therefore keep their body in a vertical position when swimming. As they grow they live more on the bottom, and their body, during rest, assumes a horizontal position; in consequence, the eye of the lower side moves towards the upper, which alone is coloured; and in many genera the mouth is twisted in the opposite direction, so that the bones, muscles, and teeth are much more developed on the blind side than on the coloured. In a great number of other *Teleostei* certain bones of the head show a very different form in the young state. The curious changes which the Sword-fish (*Histiophorus*) undergoes from the young to the adult condition are described (pp. 173—175), with illustrations.

The flesh of some fishes, says Dr. Günther, is at times, or constantly, poisonous. When eaten, it causes symptoms of more or less intense irritation of the stomach and intestines, inflammation of the mucous membranes, and not rarely death. All, or nearly all, these fishes acquire their poisonous properties from their food, which consists of poisonous *Medusæ*, Corals, or decomposing substances. Frequently, however, they are found to be eatable if the head and intestines be removed. In the West Indies, it has been ascertained that all the fishes living and feeding on certain coral banks are poisonous. In other fishes the poisonous properties are developed only at certain seasons of the year, especially at the season of propagation, as the Barbel, Pike, and Burbot, whose roe causes violent diarrhoea when eaten during the spawning season.

Poison organs are more common in the class of fishes than was formerly believed, but they seem to have exclusively the function of defence, and are not auxiliary in procuring food, as in venomous snakes. Such organs are found in the Sting-rays, the tail of which is armed with one or more powerful barbed spines. Although they lack a special organ secreting poison, or a canal in or on the spine by which the venomous fluid is conducted, the symptoms caused by a wound from the spine of a Sting-ray are such as cannot be accounted for merely by the mechanical laceration, the pain being intense, and the subsequent inflammation and swelling of the wounded part terminating not rarely in gangrene. The mucus secreted from the surface of the fish, and inoculated by the jagged spine, evidently possesses poisonous properties. This is also the case in many Scorpænoids, and in

the Weaver (*Trachinus*), in which the dorsal and opercular spines have the same function as the caudal spines of the Sting-rays; however, in the Weavers the spines are deeply grooved, the groove being charged with a fluid mucus.

Passing to the chapters which deal with the distribution of existing fishes over the earth's surface, we come to one of the most interesting portions of the work, and, from a scientific point of view, one of the most valuable.

In attempting to draw the line between marine and fresh-water species some difficulty is experienced, inasmuch as there are some which can gradually accommodate themselves to a sojourn in either salt or fresh water, and others which seem quite indifferent to a rapid change from one into the other; so that individuals of one and the same species may be found some distance out at sea, whilst others live in rivers far beyond the influence of the tide, or even in inland fresh waters without outlet to the sea.

Eliminating what may be termed the brackish water forms, Dr. Günther tabulates (pp. 208, 209) the true fresh-water fishes, of which he recognises 2269 species, and the marine fishes (pp. 255—311), which he divides into Shore Fishes, Pelagic Fishes (inhabiting the surface and uppermost strata of the open sea), and Deep-sea Fishes. Some idea of the vastness of the subject may be formed when it is stated that of the principal types of shore fishes alone, more than 3500 species may be enumerated.

To work out the geographical distribution of all these, as Dr. Günther has done, must have necessitated an expenditure of time and laborious research truly astonishing, and the result is the more to be valued, inasmuch as no previous writer on Ichthyology had attempted such extensive generalisations.

We should like to give some extracts from the chapter on Deep-sea Fishes (pp. 296—311), which is one of the most interesting in the whole volume, particularly as the knowledge of the existence of deep-sea fishes is, comparatively speaking, one of the recent discoveries of Ichthyology, for until the voyage of the 'Challenger' not more than thirty species were known. But the subject is one which cannot be discussed in a few lines, and we must therefore recommend our readers to peruse this chapter in its entirety. They will find in it a summary of the present state of knowledge respecting deep-sea fishes, and an interesting

criticism of the results of the deep-sea dredging on board H.M.S. 'Challenger.'

The second half of Dr. Günther's work embodies what he terms "the Systematic and Descriptive Part," and comprises a general classification, with diagnoses of the orders, families, and principal genera; a brief indication of the number and geographical distribution of the species, with general remarks on peculiarities of form and habit, mode of capture, use and value in commerce, and so forth.

The numerous illustrations with which the text is interspersed, viewed in connection with the descriptions given, greatly facilitate the identification of the principal genera.

No group of fishes presents more difficulties to the ichthyologist, with regard to the distinction of the species and to certain points in their life-history, than the *Salmonidæ*, and an authoritative review of this family was much needed. We are glad to find that this is now supplied by Dr. Günther in the work before us (pp. 631—651), and clears up much of the confusion and misconception which has long existed concerning the *Salmonidæ*.

It is remarkable that no less than fifteen well-marked species of this family should be peculiar to the British Islands; yet such appears to be the case. The species in question are—

1. The Short-headed Salmon, *Salmo brachypoma*. Found in the Firth of Forth, the Tweed, and the Ouse.
2. The Galway Sea Trout, *S. gallivensis*. Galway and the West of Ireland.
3. The Loch Stennis Trout, *S. orcadensis*. Lakes of Orkney.
4. The Great Lake Trout, *S. ferox*. Larger lakes of Scotland, the North of England, and Wales.
5. The Gillaroo Trout, *S. stomachicus*. Lakes of Ireland.
6. The Black-finned Trout, *S. nigripennis*. Mountain lochs of Wales and Scotland.
7. The Loch Leven Trout, *S. levenensis*. Loch Leven, Loch Lomond, and Windermere.
8. The Welsh Char, *S. pcrisii*. Llanberis Lake, North Wales.
9. The Windermere Char, *S. Willughbii*. Windermere and other lakes in the North of England, and Loch Brinach, Scotland.
10. The Loch Killin Char, *S. killinensis*. Loch Killen, Inverness.

11. Cole's Char, *S. Colii*. Lough Eske, and Lough Dun, Ireland.
12. Gray's Char, *S. Grayi*. Lough Melvin, Leitrim, Ireland.
13. The Gwyniad, *Corregonus clupeoides*. Loch Lomond, Ulleswater, Haweswater, and Bala Lake, North Wales.
14. The Vendace, *C. vandesius*. Loch Mahen, Dumfriesshire.
15. The Pollan, *C. pollan*. Lough Neagh and Lough Earne, Ireland.

These fifteen peculiar fishes differ from each other and from all British and Continental species, not in colour only, but in such important structural characters as the form and size of the fins, the number of the fin-rays, and the form or proportions of the head, body, or tail. They are, in fact, as Dr. Günther points out, just as good and distinct species as any other recognised species of fish.

Did space permit, we should like to notice many other matters of much interest which are dwelt upon in the work before us: such, for instance, as the author's remarks on Sharks and Shark-fisheries (p. 315); on Electric Rays (p. 339); on the properties and affinities of that remarkable Australian fish, the "Barra-munda" (*Ceratodus*), the survivor of an extremely ancient form, until recently believed to be extinct (p. 357); on Angler-fish (p. 470); on Flying-fish (pp. 481, 621); Whitebait (p. 658); and Eels (pp. 671, 672). On all these subjects the student of Ichthyology will find valuable information, and the general reader much to interest him. The directions for collecting and preserving fish with which the volume closes will be found of great utility not only to travellers abroad, for whose benefit they are chiefly designed, but to students at home, to whom the acquisition of fresh specimens is of the highest importance.

The natural history of fishes has never before been so fully and so ably dealt with as in the present admirable text-book, the publication of which may be said to mark a new era in the study of Ichthyology. On closing the volume, after a careful study of its contents, we have only one expression of regret to offer, namely, that the author has not given more references to important works and memoirs, wherein the student may find fuller details of the life-history of notable species than it has been possible to give in a work which purports to be only an "Introduction to the study of Fishes."

British Animals extinct within Historic Times : with some Account of British Wild White Cattle. By JAMES EDMUND HARTING, F.L.S. With illustrations by Joseph Wolf and others. London : Trübner & Co. 1880.

It is a question which possesses most interest for naturalists, a study of the present or of the past ? There is an indescribable charm in the exploration of pathless woods and lonely fens, of rugged mountain sides and smooth sandy shores, and in the contemplation of the varied forms of animal life to be met with in all these situations. On the other hand, there is a strange fascination in examining the relics of a bygone age, whether in the shape of exhumed remains of extinct animals, or ancient documents which tell of the former aspect and condition of the country ; of the wild creatures which once inhabited it ; and of the men who spent their lives in hunting them.

Certain it is that by a study of the past we are helped to an understanding of the present, and that study ought no more to be neglected in zoology than in the kindred sciences of geology and botany.

In the book before us an attempt is made to bridge over the gulf between past and present, and to supply a missing chapter in the history of British animals.

Five-and-thirty years ago Professor Owen, in his 'History of British Fossil Mammals and Birds,' made us acquainted with some strange forms of animal life whose existence on British soil in prehistoric times is incontestably proved by the discovery of their remains in various parts of the country : such, for example, as the Elephant, Rhinoceros, Hippopotamus, Hyæna, Cave Bear, and many others which can only be designated by the scientific names under which they have been described.

In Bell's 'British Quadrupeds,' of which a second edition was published in 1874, we have a history of such species as are still existing at the present time, and between these two works the volume before us aims at being the connecting link. It deals only with those animals which have become extinct in Britain within a period of which history takes cognisance. These are the Bear, the Beaver, the Reindeer, the Wild Boar, and the Wolf ; and, by way of connecting the past still more closely with

the present, a chapter is devoted to the history of the so-called Wild White Cattle which once roamed our ancient forests in company with the Wolf and the Boar, and whose descendants in a few scattered herds, scrupulously protected, are still to be seen in about half a dozen English and Scottish parks.

In most works treating of British animals some brief allusions to the former existence of the above-named species may be discovered, but the subject is usually dismissed in a very few lines, and in nearly every case with an erroneous indication of the date at which the animal became extinct in Britain. Thus, in the case of the Bear, almost every writer who has had occasion to refer to this animal has copied Pennant's statement to the effect that the last Bear was killed in Scotland in 1057 by a Gordon, who, in reward for his valour, was directed by the king to carry three Bears' heads on his banner. But, as pointed out in the work before us, this is altogether a fallacy. Reference to a copy of the original Latin MS., from which the translation quoted by Pennant was made (preserved in the Advocates' Library, Edinburgh), shows that, on the occasion referred to, the animal killed was a Boar, "*immanem aprum*," while the arms of the Gordon are Boars', not Bears', heads.

Numerous as are the Ursine remains which have been discovered at different times in various parts of the United Kingdom, there seems to be no reason for supposing that there were any Bears in this country at the date of the Conquest. Mr. Harting criticises the well-known quotations from Martial and Plutarch, relative to the transportation of Caledonian Bears to Rome, and calls attention to the fact of their being "direct testimony that the Bear was killed by the hand of man during the Roman occupation of Britain," although we observe that, in a recent notice of this work in 'The Saturday Review,' he is accused of having overlooked this important piece of evidence. He states nevertheless (pp. 12, 13), that in the collection of bones from the "refuse heaps" round Colchester, made by Dr. Bree, the remains of this animal were found along with those of the Badger, Wolf, Celtic Shorthorn, and Goat, and he adds that Professor Boyd Dawkins has also met with it in a similar "refuse heap" at Richmond, in Yorkshire, which is most probably of Roman origin. He adduces presumptive evidence, moreover, of the existence of Bears in Britain during the eighth and ninth

centuries, after which period, so far as has been ascertained, history is silent on the subject.

With regard to the Beaver, as might be expected, reference is made to the account given by Giraldus Cambrensis of the existence of this animal in Wales in the 12th century, and Boethius is quoted with reference to its former occurrence in Scotland. It is not without interest to observe that in the enumeration of furs upon which duty was to be paid on exportation at Scotch ports in the reign of David I. (1124—1153), besides the common skins of tod (fox), whitret (stoat or ermine), mertrick (marten), and cat, mention is specially made in all the MSS. of the skins of *beavers* and sable, the latter being probably the polecat. Again, among the export duties licensed to be levied at Newcastle-on-Tyne in the time of Henry I. (1100—1135), we find the *tymbra beveriorum* fixed at fourpence.

From the account given of the Reindeer (pp. 61—76), it appears that this animal was hunted in Caithness in the 12th century by the jarls of Orkney, who used to cross over to Caithness every summer for that purpose. But that the North of Scotland was not the only portion of the British islands which sheltered it, is proved by the numerous unmistakable horns and other remains of this animal which have been discovered in various other parts of Scotland, as well as in many scattered localities in England and Ireland.

The Wild Boar survived for many centuries later. It was hunted at Windsor by James the First, and its existence in Staffordshire, in the reign of Charles II., is proved by an entry in an old Household Book kept by the steward of Earl Ferrers at Chartley.

The Wolf, like the Bear, is an animal concerning whose extinction in Britain a popular fallacy exists. In almost any book on Natural History which we may take up, if there is any mention of wolves, one is almost certain to find the statement that the last Wolf was killed in Scotland by Sir Ewen Cameron of Lochiel, in 1680.

This statement, first put forth by Pennant in his 'British Zoology,' has been copied blindly by one writer after another to the present time. But it is now clear that it can have reference only to the particular district in which Sir Ewen Cameron lived, and not, as has been supposed, to the whole of Scotland.

“So far as can be now ascertained, it appears that the Wolf became extinct in England during the reign of Henry VII.; that it survived in Scotland until 1743; and that the last of these animals was killed in Ireland, according to Richardson, in 1770, or, according to Sir James Emerson Tennent, subsequently to 1766.”

Various attempts have been made at different times to reintroduce some of these extinct animals, as, for instance, the Reindeer, the Wild Boar, and the Beaver, and particulars of these experiments are given in the book before us. In the case of the Reindeer it was a failure. Wild Boars would thrive well enough in many parts of the country were it not that public opinion and agricultural interests are alike opposed to their reintroduction.

Of the three animals named, the Beaver stands the best chance of again taking its place amongst the wild animals of Britain, although, of course, only in localities where large landowners could afford it protection over a sufficiently extensive area. From the interesting account which is given of the Marquis of Bute's Beavers by the head-keeper, who has carefully watched them since their introduction in 1874, it appears that they have not only thriven well, but have increased and multiplied. We have not space here to quote particulars, but must refer our readers to the book itself, in which sportsmen, as well as naturalists, will find much to interest them; for many an anecdote of Wild Boar and Wolf-hunting in the olden time, derived from ancient documents and records, has been rescued from oblivion, and some curious information is given respecting the former aspect of the country and the extensive forests with which it was covered at the period when the wild animals in question roamed here in freedom.

Engravings, by Messrs. Wolf and Charles Whympers, of each of the animals named are given at the head of each chapter, with woodcuts of their skulls and bones exhumed in different parts of the country, facsimiles of ancient carvings and sculptures, drawings on old MSS., and engravings from early treatises on hunting representing incidents in the chase of the animals in question.

The Natural History of the Cranes. A Monograph by the late EDWARD BLYTH. Enlarged and reprinted, with illustrations, by W. B. TEGETMEIER. 8vo. London: Horace Cox. 1881.

FEW ornithologists were better qualified to write authoritatively on the Cranes than the late Edward Blyth. A long sojourn in India gave him opportunities for observing many of the Asiatic species of *Grus* in a state of nature, while his position as Curator of the Asiatic Society's Museum at Calcutta not only placed him in direct communication with many good observers who could furnish him with reliable details of the habits of these birds (amongst others), but afforded him facilities for examining a good series of all or most of the species which he described. An extensive acquaintance, moreover, with ornithological literature enabled him to bring together the most reliable information bearing on the subject which had been published prior to the date of his monograph. This appeared in the Natural History columns of 'The Field' so long ago as 1873, and the numbers containing it having become scarce, Mr. Tegetmeier was induced to reprint it, with such additional information as had become available through books and papers subsequently published. An interval of seven years having elapsed, it is not surprising that these additions have proved numerous.

The writings of Col. Tickell, Messrs. Gurney, Hume, Coues, and other well-known ornithologists, have all been laid under contribution, the result being that a very complete account of the *Gruide*, or Crane family, is now before us in book form. Omitting the doubtful species, *Grus schlegelii* and *Grus fraterculus*, Blyth recognised fifteen species of Crane, namely, the well-known *Grus communis* of Europe and Asia; the Demoiselle and Stanley Cranes found in Europe, Asia, and Africa; the Wattled Crane and two species of Crowned Crane peculiar to Africa, but of which occasional stragglers have been met with in Europe; the Australian Crane, familiarly known as "the native companion"; the Whooping and Sandhill Cranes of North America; and half-a-dozen species which may be said to be confined to Asia, namely, *Grus leucauchen*, *leucogeranus*, *collaris*, *antigone*, *viridirostris*, and *monacha*.

Since the date of Blyth's publication another species has been added to the list, namely, the Black-necked Crane, *Grus nigricollis*, which was discovered by the Russian explorer, Colonel Prejevalski, at Koko-nor, in Mongolia (thought to be the northern limit of its distribution), and was described and figured in the second volume of his 'Birds of Mongolia,' which appeared in 1876. The coloured plate there given of this species has been faithfully reproduced in the monograph now before us, together with a translation of the discoverer's account of it.

Amongst the additions and corrections made by Mr. Tegetmeier to Blyth's original memoir, we notice some rectifications of synonymy. It appears that the proper scientific appellation of the Kaffir Crowned Crane is *Balearica chrysopelargus* of Lichtenstein, not *regulorum* as erroneously attributed to him by Bennett. Blyth described the White-naped Crane of Northern Asia under the name *Grus antigone*, Pallas, overlooking the fact that the name *antigone* was appropriated by Linnæus to the Greater Indian Crane of Edwards long before Pallas gave the same name to the White-naped Crane. This Mr. Tegetmeier has set right in the present volume, wherein he also points out that the *Grus torquata* of Blyth, following Vieillot, should be known as *Grus collaris* of Boddaert, this name having priority by more than half a century.

The utility of this monograph is enhanced by the plates with which it is illustrated, amongst which we particularly notice a full-page illustration of *Grus leucauchen*, in which the artist, Mr. T. W. Wood, has happily hit off the graceful attitude so characteristic of this group of birds, and two plates which contain figures of the heads of eight other species. Nor should we omit to notice the coloured frontispiece, from a sketch by Professor Flower, representing the curious appearance presented by a vast flock of Demoiselle Cranes, as observed by him in Egypt during the period of migration.

The thanks of ornithologists are due to Mr. Tegetmeier for having placed within their reach such an excellent edition of a valuable monograph.

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ON THE WINTER NEST OF THE HARVEST MOUSE.

BY PROFESSOR H. SCHLEGEL.*

THE mode of nidification of the Dwarf or Harvest Mouse, essentially different from that of its congeners, is a fact well known to naturalists, and so singular in its nature that it must attract the curiosity of every one.

Little, however, is known about the varieties which the nests present, and nothing at all about the very different kinds of nests which the little animal builds in certain localities for its retreat in the cold season.

Although spread over a great part of Europe as far as Western Asia, the Harvest Mouse is generally reputed a species of rare occurrence. This fact finds its explanation in several circumstances. The little creature easily escapes the attention of man on account of its diminutive size and the rapidity of its motions. In other instances it is taken, notwithstanding the difference in colour, for the young of the common Wood Mouse, *Mus sylvaticus*. The nests are generally regarded by the people as birds' nests, and this goes so far that even experienced hunters could not be convinced of the contrary. When I called the attention of some mowers to these nests, they assured me that they had occasionally seen them in the fields, but had always looked upon them as a mere conglomeration of dry grass. The greatest difficulty to observe these little animals lies in the particular mode of their distribution

* Extracted from 'Notes from the Leyden Museum,' vol. iii., pp. 23—28 (January, 1881).

over the country. In general they occur in isolated couples in brushwood, cornfields, and meadows, but nobody will be aware of their presence unless he detects one of their nests; and if he has the rare luck to find one, he will soon conclude that the species is spread over the country in single couples, living at great distances from one another. It is indeed an exceptional case when they are found forming a colony, and such a one is sometimes restricted to a colony of little extent. When surprised by inundation of the meadows, they are sometimes seen flocking together in considerable numbers trying to save themselves by climbing up to the crown of grass and plants.

The system of colonisation of this animal is, however, not permanent, the colony being often reduced in the following year to a small number of couples. No doubt that the increased number produced by a favourable multiplication in certain years contributes to the fluctuation observed in the distribution of these animals.

I now purpose to enter into some details about a colony of the Harvest Mouse I met with in the summer of the year 1868, in a locality not examined before that time in its whole extent, and of which colony only a small number of couples remained in the following years. This locality is situated at the distance of about two miles from the town of Leyden, in the neighbourhood of the Castle of Endegeest, celebrated for having served as a refuge to the philosopher Descartes after his exile from France. There exists, on the right side of the road leading to the neighbouring village of Rynsburg,—not less celebrated for its Abbey and as the residence of the freethinker Spinoza,—a ditch of about a quarter of a mile in length and six paces in width, intersecting a field planted with vegetables. Its right border was for one-half of the length grown with high reeds, the other longitudinal half showing no vegetation. The ditch, however, being blind at the end, became partly dry, by evaporation, during the hot season. It was in the reeds of this ditch that a part of the colony of the Harvest Mouse had settled and had built their nests, also making use for this purpose of the herbs growing near the border side.

After having detected the colony, I gave my orders to a man who for more than forty years has been in the service of the Museum, and who has no other charge than accompanying myself or our sportsmen when out in the field—a man who catches birds,

fishes, and other animals, seeks nests and eggs of birds, and gathers all sorts of objects from the sea-shore. During the whole year he was to go to the spot every week in order to observe the little mice in question, and to extend his excursions in search for others for several miles in the neighbourhood, whereas I myself from time to time visited the field of our observations.

It soon appeared that the reeds of the ditch contained about fifty nests of the Harvest Mouse, that isolated nests were found in the neighbouring lanes, scattered here and there in herbs growing amongst the brushwood, and that a small part of the colony had established itself, likewise in herbs amongst brushwood, at the distance of about a mile from the principal colony, occupying the reeds of the ditch. The nests of this smaller colony were likewise scattered in places fit for the purpose, and their number observed did not exceed about twenty.

The discovery of so considerable a number of the curious nests of the Harvest Mouse, in a comparatively limited space, afforded great satisfaction, the more so as a previous and active search after them during forty-three years had led to no other result than the discovery of two such nests: the one found, in the year 1853, among the branches of a shrub of *Hippophaë rhamnoides*, on the dunes to the north of the village of Noordwijk-upon-Sea; the other, found in the year 1854, placed in one of the oak-shrubs growing southward of the aforesaid locality, about a mile distance from the sea-shore.

Wishing to preserve from destruction the colony of this interesting little animal, established in the neighbourhood of my residence, I selected for our collection no more than about twenty nests, showing the different modes of variation which they present in general.

I must state beforehand that the ditch concealing the largest number of nests of the Harvest Mouse was also inhabited by a couple of *Calamodyta arundinacea* and by another couple of *C. phragmitis*, that two couples of *C. palustris* had established themselves in the herbs of the immediate outside border of the reeds, and that the nests of all these birds were found and collected.

The nests of the Harvest Mouse are in general of a globular form, of the average size of a man's fist, and show, on one side, somewhat towards the top, a circular opening sufficiently wide for

the entrance of the little animal. The nests found in the ditch were commonly placed towards the top of the reeds; for those built on the outside of the water and in the shrubs the animals had chosen gramineous plants and all sorts of herbs, especially *Rubus fruticosus*, *Rumex acetosa*, and *Epilobium*. It happens even that our little animal, probably pressed by the necessity of bringing forth its progeniture, accommodates for this purpose one or the other bird's nest within its reach by covering these nests with a cap of grass. In the two instances observed of this kind, one of the nests belonged to *Calamodyta arundinacea*, the other to *Sylvia cinerea*, the latter one still containing the broken eggs of the bird.

Several nests contained the still naked young mice. As to the old mice, there was no other way to get hold of them than catching them with the hand while they were in their nest or about to enter it; and even in this way chance alone could ensure success, the movements of the little creature being performed with surprising agility; even whilst climbing their tail is partly twined about the reeds or branches—a peculiarity also observed by Pallas with respect to *Mus vagus* and *M. betulinus*. It was in vain that we set traps of different structure and provided them with all kinds of bait. *Mus sylvaticus* and *M. musculus* were from time to time caught in those traps, but not a single *M. minutus*.

I think it worth while to mention here the singular fact of a specimen of *Mus minutus* observed in the year 1851, as a straggler in the middle of the town of Leyden. A living specimen of this mouse having been caught in a trap of iron network placed in a room was brought to one of the inhabitants, then a student at the University. This gentleman, Mr. R. T. Maitland, as an experienced naturalist, at once recognised the species, and seeing that the specimen was a pregnant female, he shut it up in a bird's cage, at the same time putting into it a quantity of paper-shreds, cotton, and other soft matter. The little animal soon afterwards began to build a nest in the wonted globular form, and to deposit in it two young ones.

I now return to our colony of mice in the ditch. After the breeding season the reeds of the ditch were cut down, with the exception of a small patch of reeds in the middle of the ditch and beyond the reach of the mowers. We then saw, to our great astonishment, that our little mice established between these reeds nests of a very different character from those destined to receive

their progeniture. They were composed of different water-mosses (*Hypnum*), covering the surface of the bottom of the ditch, which for want of water had almost become dry, and attached between several stems of reed, exactly like the nests of most of the Reed Warblers, but of a fusiform shape, from one half to one foot high and from three to four inches in diameter about their middle. These nests, placed at the height of one foot above the level of the water, showed no inlet. The animal, when trying to make use of this refuge, removed that part of the upper covering of the nest, which is less densely interwoven, and is soon entirely concealed between the moss. This part of the nest serves at the same time as a storehouse for some winter provisions, as was proved by some remnants of coleopterous and a few other insects.

The Harvest Mouse, choosing, in dry parts, heaps of grass or straw for a winter retreat, or concealing itself among shrubs or herbs, it is evident that the building of the peculiar sort of winter nests, such as we have described, is owing to a just calculation of being safe against the danger of drowning.

THE AVI-FAUNA OF WIMBLEDON COMMON.

BY EDWARD HAMILTON, M.D., F.L.S.

As a railroad is about to cut through Wimbledon Common and part of Putney Heath, it may be as well before this happens to place on record some notice of the various birds which have been observed to frequent these two open spaces during the space of ten years. Although so near the metropolis, these rural Commons are the haunt of more species of birds than many people would suppose.

The first establishment of the rifle butts did not materially diminish the number of birds; but no doubt since the firing has been extended, and now goes on both summer and winter, and since the Common has been drained, many of the rarer species have been driven away. Nevertheless, an early walk either in summer or winter will still repay the lover of Natural History; his eyes will be gladdened with the sight, and his ears gratified with the note, of many a bird which he would hardly expect to hear within the sound of "Big Ben."

The Kestrel, or Windhover, is or was very common; one or two might constantly be seen hovering in the air in search of its prey. The Sparrowhawk, *Accipiter nisus*, I have occasionally come upon on the lower part of the Common, near Coombe Wood.

The White or Barn Owl I have twice seen in our garden on Putney Hill.

During summer the Red-backed Shrike, *Lanius collurio*, nested both on Putney Heath and on Wimbledon Common. A pair frequented our garden on Putney Hill, and had their nest in a high hedge in an adjoining meadow. A pair or two were always to be seen on the lower part of Wimbledon Common, below the rifle butts. These birds are very late on going to roost. I have noticed the male, when the female was sitting, hawking for beetles, and have frequently seen him catch them on the wing as late as nine o'clock on a summer evening, but a few minutes after the clock struck nine he generally disappeared.

The Spotted Flycatcher, *Muscicapa grisola*, in summer very common in many of the gardens. A pair always built in the ivy round our house, and another pair in an apricot tree against the garden wall. Although delighting to be near the haunts of men, they are jealous of any interference with their nest, and often forsake it if there is too much inquisitiveness.

The Missel Thrush, or Stormcock, is or was also common. We had two pairs near our garden. Being an early songster, he is heard constantly in the stormy months of February and March, and hence the common notion that this bird sings before a storm. The Song Thrush and Blackbird both very common; in winter there are plenty of Fieldfares and Redwings.

Both Wimbledon Common and Putney Heath are or were very rich in the *Sylviidae*. I have noticed twenty-three species, some of them rather rare. The Hedgesparrow, Redbreast, Redstart, Stonechat, Whinchat, Wheatear, Blackcap, and Nightingale. The Nightingale becomes more rare every year. A few years ago he might be heard in almost every thicket. We had three or four always singing in or near our garden and the adjoining grounds. Besides these, we had the Garden Warbler, Greater Whitethroat, Lesser Whitethroat, Wood Warbler, Willow Warbler, Chiffchaff, and Golden-crested Wren. Of the rarer species, the Grasshopper Warbler might at that

time always be heard in the evening near the reservoir, and I have, by keeping very quiet in one place, very often seen this interesting little bird creeping among the low whins and bushes. The Dartford Warbler is another frequenter of the thickest part of the furze bushes. I have twice seen this bird near the reservoir, and also below the shooting butts in the thick furze, but not since the butts have been established.

Of the *Paridæ*, the Great Tit, the Blue Tit, the Long-tailed Tit, and the Coal Tit are to be found pretty generally distributed. The Pied Wagtail is common, and the Grey Wagtail, *Motacilla boarula*, has been noticed by the side of Beverley Brook, in the lower part of the Common. The Yellow Wagtail and the Tree Pipit and Meadow Pipit are generally to be heard and seen on both Commons. The Sky Lark was formerly very common, but it is getting scarcer every year. The Wood Lark was also to be found occasionally. I noticed it on two successive years, but it is now scarce. The Common Bunting and the Yellowhammer are common enough. A pair of Reed Buntings frequented the lower part of the Common, beside Beverley Brook, in 1874.

The Chaffinch, Greenfinch, House Sparrow, and the Linnet are all pretty numerous. The Hawfinch, *Coccothraustes vulgaris*, is an occasional visitor. I noticed one in my garden in 1870; and the Goldfinch flits across the Common in its spring and autumn migration. The Bullfinch is an occasional visitor. A pair came to our garden in two successive springs, and I have no doubt bred in the neighbourhood.

The Starling is everywhere abundant, building under the stone copings of many of the houses in Wimbledon. They have increased much of late years.

The Common Crow and the Grey Crow have both been noticed on the Common. The Rook is very plentiful. There is a large rookery at Wimbledon, and another at the top of Putney Hill, the latter close adjoining our house. I had for seven years in the spring and summer months—and from the upper rooms we were very close neighbours—a good opportunity of watching the habits of these birds. In the pairing and breeding season they are most affectionate, and yet most pugnacious. They are great cowards, as well as individually brave when in defence. I have seen the hen bird beat off a vigorous attack of four or five or more coming in a body to despoil her nest, and

the moment they saw the male bird flying to the rescue they dispersed in the most sneaking manner with a peculiar caw, quite unlike their usual notes. A bird will never attack or pilfer alone; he must be supported by others, and is apparently quite aware that the attack is debasing and unauthorised. What become of the young Rooks after they have left the authority of their parents? Where do they go? In this rookery the young birds were never shot, yet the nests did not increase to any extent during the seven years—perhaps one or two, certainly not more. In the rookery at Wimbledon the young birds are shot in great numbers every spring, yet the number of nests remain about the same.

The Jackdaw is common enough, but the Magpie is becoming very scarce. A pair built in a high poplar tree near us in the spring of 1870. The Jay with his harsh scream frequented our neighbour's garden and shrubberies, and possibly built there. A pair constantly frequented the thickets at the lower part of the common before the shooting became so prevalent.

During the summer months the Swallow and Martin were common everywhere, and occasionally in the spring the Sand Martin appeared. In 1871 Swifts were extremely plentiful at Wimbledon. They appeared to congregate towards evening, and the air resounded with their shrill squeak or whistle whilst they gyrated and twisted with wonderful rapidity in all directions—now here, now far away, all gone one moment, all around you the next.

Of the Nightjar (*Caprimulgus europæus*), I have noticed sometimes as many as three in an evening walk, and too far apart as regards distance to be the same bird. The Cuckoo is plentiful on all parts of the Common. In 1867 they were very numerous.

In 1872 I saw the Green Woodpecker pretty frequently in my morning ride on the lower part of the Common. The Wryneck has been noted as frequenting both Putney Heath and Wimbledon Common, and the Common Creeper (*Certhia familiaris*) observed among the trees on Putney Heath near the pond.

On November 7th, 1873, a Hoopoe was flushed on Wimbledon Common. The Nuthatch was a regular frequenter of our garden. We were accustomed to put a nut in a particular cleft on one of the acacia trees, and it was amusing to watch the bird seek it

out; he was also very fond of a bone or a bit of meat. The Wren is everywhere; his joyous loud song greeted one in all parts—in the gardens, on the heath, and on the common.

At the end of our garden was a circular pond covered with the white water-lily, and full of fish, small gold carp and others, and a plentiful supply of frogs. The pond was overshadowed by a willow tree. One morning early I was surprised to see a Kingfisher rise from the water, and fly over the next field to a larger pond. This bird came constantly to our pond, I suspect, for the small frogs, as these used to sit on the large leaves of the water-lily, and became an easy prey to the bird.

A pair of Ring Doves, or Wood Pigeons, *Columba palumbus*, built close to our garden, and there were others in the neighbourhood. The soft “coo-coo-coo” of the male bird, and the loud flap of his wings as he rises from his perch and soars up and descends with open wings to the call of his mate in a neighbouring tree, is a pleasant episode in the many and varied movements and voices of bird-life. On the lower part of the common the Turtle Dove has been met with.

The Pheasant, being strictly preserved in Richmond Park and Coombe Wood, is occasionally flushed on the Common. The same may be said of the Partridge, and one morning I saw a brace of these birds running down the gravel-walk in my garden.

Both the Peewit and the Golden Plover have been shot on Wimbledon Common, and I believe the Peewit has bred there. The Heron is occasionally found; two or three of these birds may always be seen at the large pond in Richmond Park, and also at the pond in Wimbledon Park.

The Curlew is an occasional visitor, though very rare visitor; and a pair of Sandpipers, or Summer Snipes, every summer frequent the lower part of Beverley Brook.

Up to 1874 hardly an autumn passed without a Woodcock being shot; and the Common Snipe and Jack Snipe were very plentiful all the winter, three or four couples being often shot in a morning up to the time of draining the Common. Now, I believe, these birds are very scarce. The Landrail has been shot on Wimbledon Common; and the Moorhen and the Coot frequented the large pond in Wimbledon Park.

The Wild Duck and Teal have both been winter visitors.

About eighty species of birds, according to my observations, up to a few years ago frequented these open spaces, and there were probably more; they have no doubt diminished, owing particularly to the erection of the rifle-butts. Should the railroad now be made, farewell to those "feathered songsters"—

"No more the mounting larks * * *
Shall, list'ning in mid air, suspend their wings."

THE LAND AND FRESH-WATER SHELLS OF THE NEIGHBOURHOOD OF YORK.*

BY ROBERT MILLER CHRISTY.

II. TERRESTRIAL MOLLUSCA. UNIVALVES (*GASTEROPODA*).

Fam. LIMACIDÆ.

Arion ater.—Of course very abundant, and is to be found almost everywhere. I have seen them crawling over tussocks of grass on the wettest parts of Strensall Common. It appears to be largely carnivorous and subject to variety. A couple of reddish ones were found beneath a putrefying bird in Overton Wood, and I have seen two of a yellow colour with blue tentacles.

Arion hortensis.—This small slug is found abundantly beneath logs of wood. I have often found it abroad much later than its relatives. Like many other mollusks, it is particularly fond of devouring damp paper.

Limax agrestis.—Abounds to any extent, and comes out in mild weather throughout the winter.

Limax maximus.—Common beneath logs of wood and loose stones. I have often found them with the mantle covered with spots, but with only a very few on the rest of the body.

Further search would certainly reveal other of the *Limaces*, but these are all I have found.

Fam. HELICIDÆ.

Succinea putris.—Abundant and very fine on Clifton Ings, also at Bishopthorpe, beside the Foss, &c. Mr. Hey says, “*Succineas* seem to be very fine about here. My largest specimen is from Skelton Lane.” Mr. Jeffreys remarks that they hibernate very early, and I could not see one specimen upon Clifton Ings on September 27th, 1877, though some were found beside the Foss as late as October 6th.

Succinea elegans.—Common at Hobmoor, Askham and other places. Banks of Foss (H.)

Succinea oblonga.—In 1877 I was carefully searching some drift-sand and other rubbish from the banks of the River Foss at Yearsley Lock, when I discovered an exceedingly fine, but unfortunately rather broken and very bleached, specimen of this rare shell. Mr. J. W. Taylor, of the Yorkshire Naturalists' Union, at first doubted whether my naming of it was correct, but upon my sending him the specimen he admitted that it was undoubtedly *S. oblonga*, but he considered it as evidently fossil. It may be so, but I see no reason for considering it anything else than a bleached and weather-worn specimen. He also exhibited it, as a shell new to Yorkshire, before the Leeds Conchological Society.

Vitrina pellucida.—Very general, but not abundant. Found along the Foss, at Hobmoor, Askham, Castle Howard, Knavesmire, Bishopthorpe, Clifton, &c. I got a number of dead specimens in the “Far Wood” at Askham in March, 1876, and live ones in the early part of the following November at various places. The creature is very moist and far too big for the shell.

Zonites cellarius.—Generally distributed. With one exception (*Z. glaber*) we have every species of British *Zonites* round York.

Zonites alliarius.—Rare, though well distributed. A few are found on artificial rockwork in York. It lives in moist woods under moss or dead leaves. Acomb, Skelton, Overton, Strensall, Knavesmire, Castle Howard, and Nova Scotia Plantation. Also common in Mr. Backhouse's hothouses at West Bank. Its unmistakable smell of garlic at once distinguishes it.

Zonites nitidulus.—Commoner than I have ever seen it elsewhere.

Zonites purus.—Scarce, but to be got on the sides of the ditches upon Clifton Ings, Bishopthorpe, and elsewhere.

Zonites radiatulus.—Not a very widely-spread species, but common round York, particularly among the roots of the grass on the lawn at 20, Bootham, and at certain spots in the Far Wood at Askham Bog. Found also in the woods about Strensall, Knavesmire, and Nova Scotia Plantation.

Zonites nitidus.—Rare. Banks of Foss (H.) I have found it at Bishopthorpe and along the side of a small ditch upon Clifton Ings. Bootham collectors obtained it in 1853 at Hobmoor and near the Water-works. Ouse rejectamenta (H.)

Zonites excavatus.—Nowhere common, and rare in the York district. I have obtained it in Nova Scotia Wood, and possess a specimen from some other locality near the city.

Zonites crystallinus.—General. Abounds beside the small ditches on Bishopthorpe and Clifton Ings, in the Far Wood at Askham, one wood at Longwith, &c. As might be expected from its living on the banks, it is very plentiful in the rejectamenta of the Ouse.

Zonites fulvus.—Very well distributed, but far from being common. I have found it at Linton-up-Ouse, Hobmoor, and Clifton, and in Overton, Skelton, Stockton, Strensall, Castle Howard, Askham and Longwith Woods.

Helix aculeata.—Rare. I have never found it myself, but Mr. Backhouse says, "I have found this on the edge of Hobmoor, and have seen it both from Longwith and Queen Elizabeth's Walk;" and Mrs. Corder, of Chelmsford, has some from here. Buttercrambe Moor (H.) Among moss in Nova Scotia Wood (R.) Castle Howard (H.)

Helix aspersa.—Far too common for gardeners. I have been struck with the number of dead shells to be found in holes in the Castle and City walls, and even embedded in the mortar itself.

Var. *tenuis*.—Common.

Helix nemoralis.—Not nearly so common as might be expected. I have found a few at Askham, and many on the nettles and other large plants beside the railway-line crossing Hobmoor. One from this locality was yellowish in colour, with bands almost white. A yellowish white variety was collected about thirty years ago on a hedge-bank at Fulford by a relative of mine (R.) Its habit does not seem to lead it to ascend hedges to nearly the same height as *H. hortensis*, though I once got some fine specimens in such a situation at Copmanthorpe. This species seems to be upon the increase,

as in 1879 Mr. Hey wrote that the typical form was rare, but occurred near Heslington, while at the present time he says, "I am surprised to find the typical *H. nemoralis* is quite common near York now, as I never could find it before last year." Abounds on the Heworth and Bishopthorpe roads (H.)

Helix hortensis.—I am quite convinced that this species and the last should be looked upon as distinct. It is far more abundant in the York district than *H. nemoralis*, and here I have always found them living distinct, though in most of the localities that I am acquainted with in Essex or Sussex, where I have found one I have found both, and generally mixed with the hybrid form, notwithstanding what Mr. Jeffreys states to the contrary. It has a greater propensity for ascending to the topmost boughs of hedges; in fact, throughout the district, hedges seem to be its abode rather than the ground. It commences the ascent early in April, descending again to hibernate for the winter about the middle of October, when most of the specimens have acquired a very bleached appearance and some are almost white. I have also a young specimen that is white with only a slight tinge of yellow. It abounds everywhere, but in greatest numbers in the roadside-hedges between Askham and York, particularly near Dringhouses. The hybrid form is rare, but has been obtained at Hobmoor and at Clifton among *hortensis*, also at Acomb years ago ('Observer'). Mr. Hey says, "In Skelton lane, near York, *H. hortensis* abounds, but *hybrida* is mixed with it. The same mixture occurs at Fulford." In the hedges beside the footpath leading from St. Mary's, York, to the Scarborough railway-bridge *Helix hortensis* lives, and from among them Mr. Richardson and I have, at various times, obtained about twenty-five specimens which can only be referred to *hybrida*, as they have the pink lip unmistakably; but, instead of being yellow or pinkish, as that form is said to be, these were of a dark brown chocolate colour.

Var. *minor*.—A much smaller form which is sometimes found among the rest.

Var. *conoidea*.—Two or three specimens have been found here and there.

Helix arbustorum.—Rare as a general rule. Found at Acomb and about Clifton, but scarce, and the same may be said of Askham and Castle Howard. Near Hobmoor (B.) Common and fine at Fulford (H. & R.) On September 28th, 1877, I happened

to be upon the grassy bank against the outside of the city walls opposite the entrance to the new station. Here I chanced to observe an individual of this species scaling the walls. A search soon showed me that in the roots of the grass below my feet they were swarming, and to such an extent that in one particularly favoured spot, certainly not larger than one square yard, I obtained no less than sixty-four live specimens. Of course this was exceptional, but they teemed over the whole bank, particularly near the top, where they actually crunched beneath my feet as I walked. On looking around one had not far to seek for the cause of this unusual abundance in a limited space. At the bottom of the bank runs a much-used road with the station on the other side of it; at the top are the city walls, which they do not seem to have crossed, as I could find none upon the corresponding bank on the other side, while at one end is the River Ouse, and at the other a broad railway-line. Doubtless the impossibility of migration accounts for the congregation. The raids made upon them by the collectors from Bootham and elsewhere soon caused a thinning of their numbers, both because of those carried away and the trampling down of the nettles, which exposed them to the attacks of either rats or thrushes. At any rate, many recently emptied shells were soon strewn about. Some were of large size, but as a rule they were small.

Var. *albida*.—Quite one-sixth of the entire lot were of this variety.

Var. *flavescens*.—In the same proportion as the last-named. One cannot suppose that so many living together can have had a beneficial effect upon them, and their small size and lack of colouring, which the abundance of these varieties show, is thus accounted for. Fulford (H.)

Var. *conoidea*.—One at Castle Howard and a few by the walls.

Helix cantiana.—Very abundant. Young individuals are whitish and hispid. Common over the whole district, especially near Dringhouses and the whole way between York and Dunnington.

Var. *albida*.—I have taken a few near Dunnington.

Helix rufescens.—Very scarce near the city. I have never taken it here myself. The 'Observer' states it to have been found both at Skelton and on nettles near Holgate. It occurs under stones near Clifton, but is very scarce (H.) It is, however, common on

the magnesian limestone at Thorparch, very near the border of our district.

Var. *albida*.—Also at Thorparch.

Helix concinna.—Abundant on nettles beside the Foss, and elsewhere. Skelton Lane (H.)

Var. *albida*.—Common among the rest.

Helix hispida.—Less abundant, but common under stones and among the roots of grass.

Var. *albida*.—A few here and there.

Helix sericea.—Near Huntington several years ago, according to a gentleman belonging to the Yorkshire Naturalists' Union.

Helix fusca.—Specimens labelled "York" are in the British Museum; but it must be very scarce. Castle Howard (H.)

Helix virgata.—Less common, of course, than if we were near the sea. I found a single specimen along the roadside between York and Stockton-on-the-Forest. Abundant at Castle Howard, and on the Tadcaster road where the road from Copmanthorpe joins it, but nowhere of large size.

Var. *alba*.—Common at Castle Howard, but none, or only very few, at Copmanthorpe.

Helix caperata.—Generally a common enough shell, but here I am surprised by its almost entire absence. I have found a few at Linton-up-Ouse, and a few in the drift of the river itself. Bleached specimens in ploughed fields beyond Dunnington Common (R.) Near Acomb Wood and near Knapton (R.)

Var. *Gigaxii*.—A few from drift of the Foss (R.)

Helix ericetorum.—A single specimen in the Ouse rejectamenta is all that I have met with.

 *Helix rotundata*.—Everywhere.

Var. *Turtoni*.—Fairly common. It is flat above, but must not be confounded with the young.

Var. *alba*.—Mr. Jeffreys mentions York as a locality for this variety. I have one specimen, found, with many of the type-form, on a large log lying beside the Wiggington road.

Helix pygmaea.—According to the 'Observer,' this was found near York by the Bootham collectors in 1849, but no locality is given. Queen Elizabeth's Walk (B.) Drift of Ouse (R.) Askham (R.)

Helix pulchella.—Rather rare, but abounds among the roots of the grass on the lawn at 20, Bootham. Rejectamenta of

Ouse, &c. Queen Elizabeth's Walk (B.) Hedge-banks, Heslington (H.) Museum Gardens, very abundant (H.)

I am much surprised at the almost complete absence near the city of the genera *Bulimus*, *Pupa*, *Vertigo*, and *Clausilia*, and do not exactly know how to account for it.

Bulimus obscurus.—Very rare. A single specimen at Castle Howard, some in Foss drift (R.), and two along the Dunnington road, are positively all that I have found or heard of.

Pupa ringens.—I found one in drift from the Foss.

Pupa umbilicata.—Abundant among the roots of the grass at the foot of the wall inside the well-known "Multangular Tower" (of magnesian limestone), in the Museum Gardens,* and still more so on the narrow ledges that run round it at some height from the ground. Drift of Ouse (R.)

Pupa marginata.—Knavesmire ('Observer'). Drift of Foss and Ouse.

Vertigo pygmæa.—Found in peaty sand near Milford Junction about 1845 (B.) Very near my boundary. General (H.)

Vertigo antevertigo.—Same as last species (B.) Ouse drift (R.) Abundant periodically at Askham (H.) Foss drift.

Vertigo angustior.—Found also in peaty sand near Milford Junction about 1845 (B.) Some, presumably from this locality and presented by Mr. Backhouse, are in the British Museum.

Vertigo edentula.—A few are to be found in the Far Wood at Askham Bog. Langwith (B.)

Balia perversa.—Found in Acomb Wood in 1852, according to the 'Observer,' but I distrust the record.

Clausilia rugosa.—I have never met with it nearer to the city than Castle Howard, though Mr. Hey says it is quite common round Clifton. Longwith, Askham Bog, Holgate Lane, &c. (B.)

Clausilia laminata.—Neither have I ever met with this close to the city, though it is found among the Ouse drift. Some specimens from Tadcaster are in the Bootham Museum. Castle Howard (R.)

Azeca tridens.—Some at Thorparch. Castle Howard (H.) Ouse drift (R.)

* If any future collector should discover *Pupa secale* at this spot, he need not record it as a new locality, since I am responsible for its occurrence there.

Zua lubrica.—Abundant everywhere.

Achatina acicula.—Very scarce on the premises 20, Bootham, also on the site of the present Goods Station and the railway excavations about thirty years ago (R.) Mr. Richardson found many fine, though bleached, specimens in 1878 in the gravel-pits at Fulford. They lay in a stratum about four feet from the surface, and in the winter of 1878-9 he obtained some hundreds of specimens from the drift of the River Ouse. Most of these were small, but in good condition. Mr. Hey says it occurs in this situation after heavy floods, but not often.

Fam. CARYCHIIDÆ.

Carychium minimum.—Swarms.

Fam. CYCLOSTOMATIDÆ.

Cyclostoma elegans.—Common on the magnesian limestone, but, so far as I am aware, no nearer to York.

ERRATA.—In May number, p. 182, &c., for “Clifton Jugs,” read “Clifton Ings”; and p. 184, line 8 from foot, for “behind” read “beside.”

THE NATIONAL FISHERIES EXHIBITION.

BY THOMAS SOUTHWELL, F.Z.S.

THE Fisheries Exhibition lately held at Norwich has proved such a success in all respects that there can be little doubt it will speedily be followed by similar Exhibitions in other parts of the country, which, irrespective of the benefit certain to accrue from them in a commercial point of view, cannot fail also to be of great interest to naturalists. There doubtless, as at Norwich, will be gathered together not only many remarkable specimens of Fish and Birds from a distance, but such a representative collection of the Fauna of the district as could not otherwise be got together.

Perhaps it may be of some interest to your readers who had not the good fortune to see the Norwich Exhibition to have a few brief notes, from a naturalist's point of view, on some of the more striking objects it contained.

The building in which the Exhibition was held consisted of the spacious Volunteer Drill Hall and a large temporary

"Annexe," 275 feet long by 70 feet wide. The whole was decorated with great taste, the hall being covered with crimson cloth, pannelled out with white and gold colour, and the roof ornamented with handsome trophies of flags. The "Annexe," which was appropriated to the larger exhibits, although not so elaborately decorated, presented a very pretty appearance, the roof and walls being festooned with various forms of nets and cordage, and hung with laurels and artificial flowers. In the ground outside the building were exhibited life-boats, life-saving apparatus, trawl-nets, full-sized boats, Knott's refrigerating van, steam appliances for capstans, &c., and other objects too large to introduce into the building, including the skull of *Hyperoodon latirostris*, described at p. 258 of the present number.

Commencing with the live fish, the most noteworthy feature was a series of fourteen large Aquaria, in which were exhibited a collection of the fresh-water fish found in Norfolk, which was nearly, if not quite, complete. Amongst them were the Three-, Four- and Ten-spined Sticklebacks, Rudd, White Bream, Burbot, Smelt, Crucian Carp, Ruffe, Broad-nosed Eel, and others rare or local, giving at a glance a capital idea of the fresh-water fish fauna of a district peculiarly rich in these creatures. To these were added fine specimens of species which it is sought to naturalise, such as the Golden Tench, American Brook Trout, Lake Trout, and a splendid Grayling, bred by Mr. Louis Buxton, which attracted much attention during the whole of the Exhibition. Of course the fish-breeding establishments were largely represented, including the Norfolk and Suffolk Fish Acclimatization Society, the Marquis of Exeter, Messrs. Andrews, Guy, Littlewood, Capel, and others, some of whom, in addition to the hatching-troughs in operation, showed specimens of the fish reared at their establishments of various ages, and amongst them a fine specimen of *Salmo stomachicus* by Mr. Capel. Interesting as these strangers doubtless are, and some of them very beautiful, too, looking at the subject of their acclimatization purely from a naturalist's point of view, one cannot but feel a shadow of doubt as to the prudence of introducing them into our streams, whilst we have so many valuable native fishes which would be worth cultivating. Great caution should doubtless be exercised in introducing foreigners for whose behaviour in their new home we can have no guarantee, and which, even should they in other respects prove irreproachable,

might deteriorate in quality under the influence of the changed circumstances of their existence. Judging from the amount of success experienced in Norfolk, the results are not encouraging; a few fine Lake Trout have been taken, but *Salmo fontinalis* does not seem to thrive in Norfolk waters; after a time they disappear, in what way is uncertain.

Returning to the Drill Hall, the display of Stuffed Fish was superb, and embraced the collections of the London Piscatorial Society, the Thames Silver Trout Club, Mr. Alfred Jardine, and many other club and private collections, not to mention Mr. Gunn and Mr. Cole, two local birdstuffers, who reaped well-earned honours for their fine displays. Of course in the county of the "Broads," the Pike claims a conspicuous place, and many magnificent specimens adorned the walls. Lady Durrant exhibited the outlines of five Pike taken at Scottow in 1835, the largest of which weighed 38 lbs. and the smallest 28 lbs. Mr. Jardine showed a Pike which weighed 37 lbs. Two others were shown which were taken on the same day in different localities in Norfolk, the one weighing 36 lbs. and the other 30½ lbs.; two such handsome fish probably never before graced the window in which they were exhibited, in the flesh, side by side. To show the great weight to which Pike attain in the clear, well-stocked waters of the Broads, it is worth mentioning that eleven Pike taken in the season of 1880 weighed 281 lbs., and three rods in one day's fishing secured twenty-six fish weighing 154 lbs. Many fine Perch and Rudd, both of which fish attain a great weight in the Norfolk waters, were exhibited; but perhaps the most remarkable of all was a Bream taken at Beeston Regis by Mr. J. W. Cremer, which turned the scale at 11½ lbs. Other Bream there were, which, although they weighed 9¼, 8¾, 7 or 6 lbs., were dwarfed by the side of the Beeston monster. Two other Norfolk fish were worthy of note, not on account of their beauty, for they scarcely seemed to belong to the same species as Mr. Buckland's splendid 70 lbs. *Salmo salar*, but because they are the miserable remains of two of the only three Salmon which, to the knowledge of the writer, have been identified as having of late years been taken in Norfolk waters; one was captured on a flooded meadow at Fakenham, the other in a smelt-net at the New Mills in Norwich. The third Salmon was also taken on some flooded meadows near the city; it measured 43 inches in length, and weighed 17½ lbs., and not-

withstanding its emaciated condition, was cut up and sold in the Fish-market! Some very fine River Trout from the Thames, as well as several Norfolk rivers, were exhibited, showing the large size to which these fish attain when they remain long in undisturbed possession of a deep corner of a mill-pool where the supply of food is plentiful.

Amongst other fish worthy of note were a fine Perch Pike and a Swedish Lake Trout, presented by the late W. A. Lloyd to Mr. Gurney; an Opah caught off Yarmouth, particularly interesting for its immature condition; a Deal-fish caught in Holkham Bay (see *Trans. Norf. & Nor. Nat. Soc.*, iii., p. 95); a beautifully articulated head of the Angler-fish; and many others, of which space will not permit the mention.

Looking round at the beautiful array of bright and handsome cases which lined the walls, one could not help being struck with the conviction that fish-stuffers have yet much to learn and a great deal to unlearn. The very best specimens were more or less stiff, formal, and devoid of life, and nothing could be more incongruous than the conventional mounting generally adopted. Why should Pike be almost invariably represented floating open-mouthed in the air with tufts of reeds, grasses, and other aquatic plants innocently blooming beneath them? Two cases of Scandinavian fishes exhibited by Mr. J. L. Sayer, although not generally very attractive in their appearance, were greatly in advance of the majority, being life-like in position, and although too crowded, all their surroundings were in accordance with their native habitat. It only needed a glance, however, at the fine collection of casts from the Buckland Museum, but especially at the Pike exhibited by Mr. Jardine and the Piscatorial Society, cast by Buckland and painted by Rolfe, each lying in its basket of grass, to show the true method of preserving the accurate representations of these creatures. It must not be forgotten, however, that though the form may be left to the plasterer, a Rolfe is required to give it the colour. There were a few groups of stuffed fish represented as thrown in heaps on the river-banks, which had a good effect.

Considerable space was devoted to Oysters and Oyster-culture, and many varieties of this rare bivalve, British, French, Dutch, Portuguese, and American, were exhibited, both mature and in all stages of growth, from "spat" upwards. There were also interesting exhibits of Mussels, Cockles, and other shell-fish for

which the Norfolk coast is noted, some of which are of great importance as bait for the long-line fishermen.

Construing the class "Birds that prey upon Fish" in the most liberal manner, the Committee secured a very fine collection of birds, the great majority of them from local collectors and the work of local preservers. It is needless to say that Mr. H. Stevenson's exhibit was the gem of the collection; every bird had its own history, and was mounted in the most skilful manner under the critical eye of one who has made the habits of its kind a life-study. The selection from Mr. Stevenson's collection included, amongst others, the White-tailed Eagle, Osprey, Marsh Harrier, Stilt Plover, Black-tailed Godwits, White Stork, Ruffs and Reeves, White-eyed Pochard, Graylag Goose, White-fronted Goose, Pomatorhine and other Skuas, Terns, Bittern, Little Bittern, Smew, Bearded Tit, Pectoral and Broad-billed Sandpipers, Baillon's and Little Crakes, &c. Some of the cases were perfect pictures; witness the Lesser Tern hovering over its wounded mate, who lies with extended wings beside her nest and eggs. Another case representing a snow scene, "Hard times on the Broads," with the frozen-out marsh birds ruffling their feathers, cold and disconsolate. A third case, consisting of Ruffs in full feather, of every shade from black to white, and in every conceivable attitude which these strange birds assume when performing on the "hill." Next to Mr. Stevenson's came Mr. Cole's collection, which contained some beautifully-mounted birds, particularly, Waders: the cases of Greenshanks, Curlew Sandpipers, Knots and Turnstones, all in fine plumage, fully entitled Mr. Cole to the special prize of £10 which he received. On the other side of the Hall Mr. Gunn had a very fine exhibit, which took a gold medal. Conspicuous amongst the 250 specimens exhibited was a case representing a fine Otter standing at bay upon a hollow stump; within were seen its young, anxiously awaiting their dinner in the shape of a monster Roach, which their parent, startled by the sound of approaching hunters, held under her foot.

It is impossible to point out all the objects of interest which filled the Exhibition, the whaling-gear from Peterhead, Walrus heads from Spitzbergen, the singularly beautiful flowers and fungi preserved by Mr. English, of Epping, by means of a process known only to himself, and many others. The beautiful fishing-

tackle displayed in the elegant cases, the lovely flies and pliant, well-balanced rods, the graceful models of trawlers and river boats, and a thousand other matters which went to make up the harmonious whole, do not fitly find a place in this notice, nor, however appropriate, will space allow of justice being done to the few but valuable books on fish and fishing, or the grand pictures by Van Hacken, exhibited by the Fishmongers' Company with many others, amongst which Mr. Mundella's presentation picture by Rolfe was conspicuous; there were also several other beautiful pictures by that inimitable painter of the finny tribe. There was one other feature in connection with the Exhibition which proved very attractive; during its continuance a series of lectures was given on subjects connected in some way with the objects exhibited; it is only necessary to say that Professor Huxley discoursed on the "Herring," Mr. Jex on "Deep-sea Fishing," Mr. R. B. Sharpe on "Fish-eating Birds," and Mr. H. N. Moseley on "Deep-sea Dredging"; and it will be readily understood that the lectures were both attractive and instructive.

The Exhibition at Norwich, the first of its kind in this country, has been a thorough success from its beginning to its close, and it is only to be hoped that future exhibitions of the same kind, founded upon the experience there obtained, will be even more successful, and of still greater practical utility.

ORNITHOLOGICAL NOTES FROM MAYO AND SLIGO.

BY ROBERT WARREN.

THE intensely cold winter and cold and backward spring have not prevented some of our summer visitors from putting in an early appearance this season; and although on the nights of the 27th, 29th and 30th of March, the thermometer registred six, five, and three degrees of frost respectively, yet a pair of Sandwich Terns were seen and heard on the river here on the 31st, but the main flight did not arrive till some days later.

I heard the first Chiffchaff about the place here on the 1st of April, but the temperature falling with the easterly winds, and the nights being frosty up to the 6th, checked its singing for several days, though I frequently remarked it while silent,

hunting for insects along the sheltered and sunny side of the hedges. Chiffchaffs appear more numerous and more generally distributed about the neighbourhood this season than usual, and I heard several singing in the plantations of Scurmore, a place I never knew them to frequent previously.

The Willow Wrens were neither seen nor heard until the 13th April, and Swallows on the 18th. Whimbrels were heard on the 29th, and became very numerous a few days afterwards, as many as thirty birds being occasionally seen together on the sands.

Common Terns appeared on the 2nd May. The Corn Crake was heard on the 6th, and the Cuckoo on the 7th. Swifts and Spotted Flycatchers were seen on the 9th, but I did not hear a Whitethroat until the 12th, though I was carefully watching their favourite hedges.

In contrast to the above-mentioned arrivals, some of our winter birds are still remaining. On the 14th May, having gone down the river and estuary to Bartragh, I observed over two hundred Godwits on the sands, and though I watched them carefully through a glass for some time I was unable to perceive a red-breasted bird amongst them; but I remarked a few Knots scattered amongst the flock. Further down the channel near Scurmore I saw thirty-seven Red-breasted Mergansers. Close to Bartragh I came across three Red-throated and a Great Northern Diver. These Divers looked very handsome in their fine summer plumage, and as I had an excellent opportunity for observing them, I took plenty of time and enjoyed the sight very much, for it is not often one can observe these birds in their summer plumage. I took especial care in watching the Great Northern Diver, and though I caused him to dive more than a score of times I could see nothing unusual in his mode of procedure.

One of the sad effects of the late severe weather in this district is the complete extermination of the Song Thrush, and stranger still, of the Missel Thrush also. The Song Thrushes last summer were just beginning to recruit their losses of 1878-9, but now there is not one to be heard or seen in this neighbourhood, and from enquiries I have made about the well-wooded demesnes near Enniscrone, Ballina, and Killala, I have not been able to hear of a bird of either species being heard singing this

season. So that in a district of country extending for twelve miles in length and varying from two to four miles in breadth, the result of my careful observation and enquiries has been that not a single individual of either species has been seen or heard this spring.

A small rookery was commenced here last year, and the cause of the birds settling down so far from the old rookeries (fully a mile, and a mile and a half from the two nearest) may, I think, be attributed to the Rooks being so well fed here during the late severe winters. In the winter of 1878-79 large numbers of Rooks came daily to be fed with the poultry in the farm-yard, and roosted every night in the adjacent trees; but as the weather became milder and food more abundant they went off, leaving after them half-a-dozen weakly-looking birds. Late in the spring a pair of these birds began carrying sticks to an old Magpie's nest, and frequented it for a few days, when they gave up building, leaving the nest altogether, and made no further attempt, that I could see, at building another nest. These few birds remained about the yard and lawn all through the summer, and when the severe weather set in were joined by numbers of others, which, as usual, fed in the yard with the fowls throughout the winter until the spring season, when they all, except three birds, left for the neighbouring rookeries. These three birds, however, kept close about the yard until the 14th April, when a pair of them took possession of the old Magpie's nest and built in it; and the third bird, in about a week after, finding a mate, also built a nest close by his companions. The young of the two nests were reared safely, and with their parents kept close about the place the entire season, roosting on the trees near the yard; there, as usual when the hard weather began, they had plenty of companions feeding with them in the yard, some of which must have joined the members of the old colony this spring, for now there are eight nests built in the little grove.

OCCASIONAL NOTES.

WATER RATS CARRYING THEIR YOUNG.—Walking by the side of a stream early in May, I saw a large Water Rat carrying in its mouth a half-grown young one. While swimming the young rat was held well up out of the water; sometimes, however, the old one would leave the water and cross a bit of mud, still holding the youngster, which while in sight it never once dropped. It presently, however, disappeared round a bend, but in a few minutes I again saw it returning without its burden, which had doubtless been lodged in a place of safety. She seemed in a great hurry, and was perhaps going back for another young one. Probably the nest had in some way been disturbed, or was threatened with danger, and the family were removing to safer quarters. It seems strange, however, that the youngsters, which, judging by the size of the one I saw, were certainly pretty well half-grown, could not be trusted to follow their dam without help. The removal of the whole family by this means must have been no slight undertaking, as the distance she carried the young one, while in my sight, was at a rough guess from twenty to thirty yards, and she may have carried it some way before I noticed her; probably there were from four to six of them to move, that being, I believe, about the average number in a litter. In April, 1871, I found three nests, in one of which the young were no bigger than full-grown house mice, but were covered with hair and could swim and dive well. The glossy fur of this little animal receives reflections very readily, and is I think a means provided for the safety of its possessor. Many persons must have noticed how difficult it is to catch sight of a Water Rat sitting perfectly still on wet mud or in some similar situation, by reason of the fur receiving by reflection the general tint of its surroundings. The same may be said of the Otter.—G. T. ROPE (Blaxhall, Suffolk).

[The fact that Water Rats carry their young is not noticed by Bell in his 'British Quadrupeds,' and is probably not generally known. We satisfied ourselves upon the point, however, many years ago, and have several confirmatory notes by other observers. See 'The Field,' May 5th, May 27th, and June 3rd, 1876.—ED.]

WILD ANIMALS PAID FOR BY CHURCHWARDENS IN YORKSHIRE.—In looking over the minute-book of the churchwardens' accounts for the parish of Bolton Percy, I came across some curious entries which may interest some of the readers of 'The Zoologist.' The book begins in the year 1788, and from that date, till 1830, I find various entries for vermin-killing. At first these entries are annual, and they gradually become

fewer, till, in 1830, they cease altogether. I extract a few of these entries as specimens: the first is (1788) "4 Foxes and a Foulmart, 4s. 2d." (1789), "4 Foulmarts, 8d. Paid for a Foxes head, 1s. For a Bever do. 2d." For Bever I should imagine we must read Otter, since the parish is near the Wharfe, and an Otter head is entered further on. Payments for Foxes and Foulmarts occur annually till 1798, when 2 Foulmarts cost 4d. each; 3 Foxes, 3s.; 1 Otter, 1s.; total, 4s. 8d. Foulmarts must have grown scarcer, for, in 1795, the price was raised from 2d. to 4d., and an Otter (*sc.* Bever) from 2d. to 1s. In 1816 we find 7 Fox heads entered; in 1829 is the last entry, "2 Foxes heads, 2s." There are some other curious entries, *viz.*, in 1792, "To turning Dogs out of church, £1"; and, in 1819, "Pd. G. Gill, dog-whipping, £1."—C. FULLERTON SMITH (Bolton Percy, Yorkshire).

ON A SKULL OF HYPEROODON LATIFRONS (ROSTRATUS?) FROM THE NORTH SEA.—A very perfect skull of this Whale (minus the lower mandible) was dredged up by the smack 'Gladiator' on the Great Fisher Bank on the 15th March, 1881, from a depth of thirty-six fathoms, and landed at Grimsby, whence it was sent as a present to a gentleman residing in Norwich, who exhibited it at the National Fisheries Exhibition, recently held in that city, and afterwards presented it to the Norfolk and Norwich Museum, where it has been added to the interesting collection of Cetacean remains already possessed by that institution. The skull in question, which, as before said, is unfortunately without the lower mandible, although completely divested of all the integuments, is still so fresh as to be very full of oil, although the presence of colonies of marine animals (Crustacea, &c.), in the cavities shows that it has long been stationary at the bottom of the sea. The following are the principal measurements:—Total length of skull, 69 inches; height of occipital portion, measured in a straight line from the ground, 26 inches; height of maxillary crests, measured in the same way, 33 inches; breadth of the maxillary crests in front—left, $8\frac{3}{4}$ inches; right, $8\frac{1}{4}$ inches. This skull corresponds well with Gray's figure in the Zoology of the 'Erebus' and 'Terror.' The occipital portion appears insignificant in comparison with the maxillary crests, which will be seen, from the foregoing measurements, to exceed it in height by seven inches; they are very much thickened and reflexed internally, presenting a broad and very much roughened front; the inner surfaces, where the maxillary bones approach each other, are very irregular, the inequalities corresponding in the two crests, so that the space left between them is about sufficient to permit the hand to be introduced. Very little is known of the animal to which this skull belongs; from its cranial peculiarities, it has been described as distinct from *Hyperoodon rostratus*, the Common Beaked Whale, in which the maxillary crests do not exceed in height the occipital

portion of the skull, and are sharp-edged, Dr. Gray even going so far as to create for it a new genus (*Lagenocetus*); but it is now generally held that the excessive development of the maxillary bones is a sexual peculiarity, and that Eschricht's belief that the form known as *H. latifrons* is really the male of *H. rostratus* will prove to be correct. The sex of the individual from which the skull now recorded was derived not being known, of course no fresh light is afforded by it towards settling the point at issue, nor can this be done until many more specimens of both sexes and various degrees of maturity have been examined, or till a female of the *latifrons* type, or an adult male of the *rostratus* type, is met with.—T. SOUTHWELL (Norwich).

SUPPOSED OCCURRENCE OF THE CRANE ON THE PROMONTORY OF HOWTH, NEAR DUBLIN.—On the 18th of January last, during the severe snowstorm, my cousins, the Messrs. MacDougall, of Howth, while wildfowl shooting on the southern side of the Hill of Howth, saw a large bird resting on the snow, a rocky point by the seaside. At first they thought it was a Heron, but, upon a nearer approach, it arose, and, circling upwards to a considerable height, flew northwards over the hill. They were close enough to see its colours, and describe it as having a black head, and the rest of the body greyish blue. But what chiefly attracted their attention was its enormous size, about "twice that of a Heron," its appearing to have no neck (from the head being thrown back), and the apparent appendage to the tail caused by the legs being thrust out straight behind. Upon measuring its foot-mark in the snow, from the hind to the tip of the middle toe, it was five inches and a half in length. They followed the bird over the hill and watched for it afterwards, but it appeared no more. I think there can be no doubt that this bird was a Crane, which is an extremely rare visitant to Ireland. Thompson mentions two having been obtained (one in 1834, and another in 1846), and quotes from Smith's Histories of Waterford and Cork to the effect that flocks were seen in those counties during the great frost of 1739. Two, which are now in the Museum of Natural History in Kildare Street, were obtained in Kerry about twenty years ago. Two, which are now in the Museum of Science and Art, Kildare Street, Dublin, were recently transferred from the collection of the late Natural History Society of Dublin, in which they had been preserved for many years, having been obtained from the South of Ireland.—HENRY CHICHESTER HART (Dublin).

ORNITHOLOGICAL NOTES FROM THE ISLE OF WIGHT.—During the past winter wildfowl were unusually abundant on the Solent, but being much disturbed and shot at were very wild. Vast flocks of small birds were seen passing over the island in a north-westerly direction, many perishing by the way, being washed up by the tide, as reported in the local papers.

Few rare birds have been heard of, although many may have appeared without being noticed, there being few persons in the island, taxidermists excepted, who have a fair knowledge of birds. Messrs. Smith, of Newport, inform me that a Common Buzzard, a male, was sent to them. It was shot at Steephill, in this neighbourhood, on the 22nd January, while seated on a wall,—the ground being covered with snow,—preying on a Starling, of which species there is a colony in the ivy-clad walls of the Castle. On dissection the remains of a Thrush was found in the stomach. Two Thick-knee Plovers were shot at Atherfield on the 5th November by a tradesman of this town, some lads having observed them in a ploughed field; though thus exposed they were readily approached, and on taking wing one was brought down at the first discharge; the other having alighted was stalked and also secured. In the gizzard of the one examined grain only was found. A female Great Crested Grebe was shot on January 20th; the stomach contained a mass of feathers—not an uncommon thing, it appears, with birds of this family, though difficult to account for when not moulting or nesting, as in this case. Macgillivray says that a great quantity of feathers was found in the stomach of a Red-necked Grebe. A Heron, I hear on good authority, was captured when “napping,” or half-starved, by a brook-side, but released after a week's confinement, being found too troublesome a charge. I am informed by Messrs. Smith that on dissecting two birds of this species some time back, a trout about nine inches in length was found in one, and the stomach of the other contained a fish eleven inches long. Early in January a male Snow Bunting, in adult plumage, being mostly of a white and cream-colour, was shot at Westover, in the northern part of the island, by a gamekeeper. An albino or yellowish white Greenfinch was shot on January 3rd at Yarmouth. I hear that a Green Woodpecker was shot more than a year ago near Newtown, not far from Parkhurst Forest; my informant saw it at the time, and knows the man who shot it. Woodpeckers are rarely met with in the island; two or three instances only have occurred to my knowledge. Though Rooks were seen in their nesting-trees for some weeks, seemingly none the worst for snow or frost, they were not observed to repair their nests till March 1st.—HENRY HADFIELD (Ventnor, Isle of Wight).

SMALL BIRDS CARRIED BY CRANES IN THEIR MIGRATIONS.—Dr. Van Lennep, in his ‘Bible Customs in Bible Lands,’ speaking of the great numbers of small birds which inhabit Western Asia, as compared with Europe and North America, explains the circumstance by the fact that “even those of feeblest wing have an easy road from Palestine, Syria, and Mesopotamia, by the Isthmus of Suez, and over the narrow Red Sea, to their winter quarters in Tropical Africa, whilst Nature has provided them with *extraordinnry means* of conveyance from Asia Minor southward across

the Mediterranean. . . . The Swallow, and many other birds of similar powers of flight, are able to cross over the entire breadth of the Mediterranean, especially by taking advantage of a favourable wind. But many birds are quite incapable of flying over a surface of 350 miles from headland to headland across the Mediterranean without alighting, and would require many days, and even weeks, to perform the trip through Syria and Palestine. Such are the Ortolans, Beccaficos, Wren, Titmouse, smaller thrushes and finches, with a hundred other diminutive specimens of the feathered tribes, . . . and as the severity of the winter would be fatal to them, not only in Asia Minor but even in Syria and Palestine, He who is ever mindful of the smallest of His creatures has provided them with means of transportation to a more genial clime. Many of them, indeed, find their way downward from Palestine into Arabia and Egypt, but this would be difficult, if not impossible, where lofty mountains and broad seas intervene, and to meet such cases *the Crane has been provided*. . . . Most of these birds are migratory. In the autumn numerous flocks may be seen coming from the north with the first cold blasts from that quarter, flying low, and uttering a peculiar cry, as if of alarm, as they circle over the cultivated plains. Little birds of every species may then be seen flying up to them, while the twittering songs of those already comfortably settled upon their backs may be distinctly heard. On their return in the spring they fly high, apparently considering that their little passengers can easily find their way down to the earth."

[Can any correspondent furnish confirmatory evidence of this?—Ed.]

PIED FLYCATCHER IN PERTHSHIRE,—A male, still in winter plumage, was shot here on 23rd April. It had been observed for about a week, and was evidently recognised as a stranger by the other small birds, by whom it was somewhat mobbed. This species has only occurred in Scotland as a rare straggler, the last occurrence I find recorded being also a male, obtained at North Berwick on 23rd May, 1872 (Lumsden, Proc. Nat. Hist. Soc., Glasgow, ii., p. 192).—J. J. DALGLEISH (Dumbarton Grange, Culross, Perthshire.)

[Other reports have reached us of the occurrence of this little bird in East Sutherland and Rosshire during the present spring.—Ed.]

WHITE LANDRAIL NEAR EXETER.—I have been given, for this Museum, a Landrail shot at Pinhoe, near Exeter, on May 3rd. It is entirely of a dirty white or dove-colour. The irides were bright red. Another specimen, in ordinary plumage, has also been given to me. It was picked up dead on the 7th inst. in one of the "greens" or enclosures, in front of the houses on Southernhay, in this city. One of its wings was broken close to the body, perhaps by flying against some object. A Landrail was brought to me May 8th, 1870, which had killed itself by flying

against the telegraph-wires on the Exmouth Railway, near Topsham. Last September and October a good many were killed near Exeter, and I saw four specimens in the poulterer's shops.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

OSPREY IN DORSETSHIRE.—A few days ago (May 3rd), in company with my eldest son, I had the pleasure of seeing a fine Osprey sitting on the parapet-wall of a bridge in Morden Park (adjoining the parish of Bloxworth). It flew slowly away when we were about a hundred yards distant, taking the direction of the Wareham Estuary. We have been twice since to Morden Park, hoping to catch another sight of this rare visitor, but without success, though it has been seen there on more than one occasion since by the gamekeeper, who lives in the park.—O. P. CAMBRIDGE (Bloxworth Rectory, Dorset).

AN UNIDENTIFIED OWL SHOT IN IRELAND.—In the hope that some one of your readers may help me to identify the bird, I send you a description of an Owl in the collection of Dr. Burkett, of Waterford, shot at Behe Lake, Co. Waterford, January, 1851. It seems too small for the Eagle Owl, and differs in other respects from that species. Beak black. Irides (artificial) yellow. Tufts on top of head pronounced. Top of the head, tufts, upper part of back, and wing-coverts, dark brown, the larger feathers mottled at each side about the middle with light yellowish brown, and those feathers on the top of the head and upper back having also on each side near the end a spot of white. Lower half of back and wing-coverts also dark brown, mottled at sides with pale or yellowish brown, those feathers on the *outer* wing-coverts having a large spot of white near the end of the outer web (like an ocellus) surrounded with dark brown, with a small spot of white or pale yellowish brown half down the feather, sometimes right across it, sometimes on the outer web only; these series of large spots of white and buff becoming more numerous on the long underfeathers of the scapulars, where they occur on both webs and run into bars. Rump and upper tail-coverts dark brown, mottled and barred with buff and white. Thus the large white spots are most conspicuous on the upper back and outer wing-coverts (from carpal joint outwards), while the irregular bars are on the upper tail-coverts. Primaries, secondaries, and tail-feathers, dark brown, with bars of paler brown and white, which bars are mottled with the darker brown, except on the inner webs, where they run into white. Tertiaries with mottled bars of the buff or white. Cere covered by feathers of facial disk. The latter is mottled or barred with dark brown on a ground of buff or dull white. Lower margin of disk having on each feather several small bars of dark brown. Throat white. Feathers on upper breast dark brown, having a large spot of white on each web towards the end, the middle portions of the feathers mottled transversely with

reddish or yellowish brown, but the tips of the feathers unmixed dark brown, forming dark spots on the breast. On the lower breast, flanks, belly, legs, and under tail-coverts the markings run into dark brown bars on a ground of dull white or pale buff, these bars becoming narrower on legs and under tail-coverts. Claws black. Total length, $18\frac{1}{2}$ to 19 inches; carpal joint to longest quill-feather, $12\frac{1}{4}$ inches: first quill-feather much shorter than second, the second shorter than third; third and fourth nearly equal, but the fourth the longest in the wing.—R. J. USSHER (Cappagh, Cappoquin).

LONG-EARED OWL BREEDING IN DORSETSHIRE.—The Long-eared Owl breeds every year in Morden Park (near Bloxworth), but until a few days ago (May 3rd) I had never succeeded in obtaining its eggs. The nest was made in an old Squirrel's "drey" near the top of a Scotch fir, and contained three perfectly fresh eggs.—O. P. CAMBRIDGE (Bloxworth Rectory, Dorset).

THE BOAR-FISH AT EASTBOURNE.—Four specimens of the Boar-fish, *Capros aper*, have recently been taken on the shore here. In three instances they were captured alive.—CHARLES FORAN (Marshfield House, Eastbourne).

INTRODUCTION OF THE BLACK BASS INTO ENGLAND.—There seems to be a prospect that we may have, in the course of time, a new fish in England, the Black Bass, which is esteemed a delicacy in Transatlantic bills of fare. An attempt has been made to acclimatise this fish, and those who are interested in the scheme appear to have hopes of success which, perhaps, may not be premature or ill founded. The Bass that have been imported were brought from the Delaware by an agent of the Marquess of Exeter. On his first journey he started with 250 of the fish, and after nursing them with the greatest care during the voyage, cooling the water with ice, pumping in air, and taking every precaution, 153 of the number originally caught reached England, and were turned into Whitewater Lake, near Stamford. Most of the lost fish perished whilst crossing the Gulf-stream, when the temperature of the water in which they were could not be below 78° , the atmosphere being 80° for nearly five days. On the second visit the agent started from America with 1200 of the fish, and was able to bring 812 to the Lake, where most of them were turned out to join their brethren. Where the others were placed does not appear. Not any of those in Whitewater Lake have been caught yet, but two of them were found dead in a pipe where they had got jammed, the pipe supplying a filterer, where they could get in but could not get out. These two were some half-pound in weight, considerably heavier than when they were put in; and so it is

naturally supposed that the rest are thriving. The first lot that were turned out will be three years old in April, when they are expected to begin to breed. Any really palatable addition to the scanty list of fish used by English cooks will be a boon, and the result of Lord Exeter's experiment will be watched with considerable interest.

POISONOUS QUALITIES OF STARFISH.—Mr. Parker's note (*ante* p. 214) reminds me that when staying in one of our south-coast fishing towns, a year or two ago, we complained of the noise made each night by our neighbours' cats. Our landlord made very short work of the nuisance, by simply gathering and cutting up some common "Five-fingers" Starfish, and having fried them in dripping the pieces were judiciously placed where they might be found by our enemies. In the course of a few days dead cats were more numerous than living ones in *that* neighbourhood.—JOHN T. CARRINGTON (Royal Aquarium, Westminster).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

May 3, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Prof. F. Jeffrey Bell read the first of a series of papers on the systematic arrangement of the *Asteroidea*. In the present communication the author directed attention to the large number—more than eighty—of described species of the genus *Asterias*, the subdivision of which had never yet been attempted. After a list of the species, with reference to one description of each, and a list of the synonyms, he proceeded to describe and make use of certain characters as an aid in the classification of the species; the number of rays, of madreporiform plates, and of ambulacral spines forming the more important, and the form and character of the spines the less important points. The author then proposed a mode of formulating results by the use of certain symbols; and concluded by describing five new species.

A communication was read from Dr. M. Watson, containing some observations on the anatomy of the generative organs of the Spotted Hyæna, in continuation of a previous paper on the same subject.

Mr. Oldfield Thomas read a memoir on the Indian species of the genus *Mus*. The present paper was an attempt to clear up the existing confusion in the synonymy of the Indian species of this genus, of which the author recognised about nineteen as valid.

A communication was read from Mr. Edgar A. Smith, containing remarks on some specimens of *Cypræa decipiens*, lately received by the British Museum.

A second paper by Mr. Smith contained the descriptions of two new species of shells from Lake Tanganyika.

Capt. G. E. Shelley read a paper containing an account of seven collections of birds recently made by Dr. Kirk in the little-explored regions of Eastern Africa. Two new species were proposed to be called *Coccyzus albo-notatus* and *Urobrachya Zanzibarica*.

Mr. Arthur G. Butler read a paper on a collection of Lepidoptera made in Western India, Beloochistan, and Afghanistan by Major Charles Swinhoe. The collection contained examples belonging to three new genera and fifteen new species.

May 17, 1881.—Dr. GÜNTHER, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of April, 1881, amongst which special attention was called to an Indian Darter, *Plotus melanogaster*, received in exchange from the Zoological Gardens, Calcutta; a female Beisa Antelope, *Oryx beisa*, born in the Gardens April 12th, believed to be the first example of this Antelope that had been bred in captivity; and a Mountain Ka-ka, *Nestor notabilis*, transmitted as a present to the Society by Dr. A. de Lautour, of Otago, New Zealand.

Mr. Sclater exhibited and made remarks on examples of four Parrots of the genus *Chrysotis*, from various islands of the Lesser Antilles.

A communication was read from Mr. Carl Bock, in which he gave an account of the Land and Fresh-water Shells collected in the highlands of Padang, Sumatra, and in the Eastern and Southern parts of Borneo, during his travels in those districts. Eight new species were described.

A communication was read from Mr. G. B. Sowerby, jun., containing descriptions of eight new species of Shells from various localities.

Mr. W. A. Forbes read a paper on the anatomy and systematic position of the Jacanas (*Parridæ*), which he showed were in no degree related to the Rails, but form a separate group to be placed amongst the Plovers and allied birds (*Limicolæ*). The author also called attention to the peculiar form of the radius in the genus *Metopidius*, which is not developed in the other genera of this group.

A communication was read from Mr. L. Taczanowski, containing the description of a new species of Weasel from Peru, proposed to be called *Mustela Jelskii*, after its discoverer.

A communication was read by Mr. W. F. Kirby, containing a description of the Hymenopterous Insects collected in Socotra by Prof. Bayley Balfour. Of these two were apparently new to science.

A communication was read from Mr. Francis Day, containing remarks on the range of *Apogon Elliotti*.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

May 4, 1881.—H. T. STANTON, Esq., F.R.S., &c., President, in the chair.

Mr. R. W. Fereday (Christchurch, Canterbury, New Zealand), hitherto a Corresponding Member, and Mr. Charles Foran (Marshfield House, Eastbourne, Sussex), were balloted for and elected Ordinary Members of the Society. Mr. James Edwards (Bracondale, Norwich), was elected an Annual Subscriber,

Mr. Roland Trimen exhibited and made remarks on the following Lepidoptera, all of which had been taken in Natal by Col. J. H. Bowker:—

The sexes of *Pieris Saba*, Fab., captured in *copuli* near the Umgeni in January last. Mr. Trimen remarked that, as long ago as 1837, Boisduval had united the strikingly dissimilar sexes of this Pierid; but he was not aware that there was any record of positive evidence in support of that lepidopterist's opinion. He was especially pleased that Col. Bowker should have been the captor of this pair; as in spite of his intimate acquaintance with the extraordinary sexual disparity prevailing among butterflies, he had been very sceptical as to the identity of *Pieris Saba*, Fab. (the female form, which is more black than white) with *Pieris orbona*, Boisd. (the male form, which is almost entirely white). Mr. Trimen further expressed his opinion that the black and white female of this butterfly was probably modified in mimicry of a common and evidently protected diurnal moth, *Nyctemera apicalis*, Wlk., which frequents the same localities.

The sexes of *Diadema mima*, Trimen, taken paired at D'Urban on February 11th last. This butterfly is an accurate mimic of *Amauris Echeria*, Stoll., copying the variety with white-spotted fore wings, which is common in Natal.

The larval cases, pupæ, and imago of a *Tinea* (apparently *T. gigantella*, Stainton), found inhabiting the hoof of a horse. Col. Bowker writes that he sent to England a hoof of the troop-horse killed with the Prince Imperial in Zululand in June, 1879, to have it mounted as an inkstand. Since the return of the inkstand he had been obliged to take it to pieces to get rid of the moths, which were still emerging as late as February last. *Tinea gigantella* (originally described by Mr. Stainton from specimens brought by Mr. Trimen from South Africa in 1859) is considered by the founder of the species as synonymous with Zeller's *Scardia vastella*, whose larva is noted as feeding on the horns of antelopes. The closely allied *T. orientalis* has also been recorded by Mr. Stainton (Ent. Mo. Mag., xv., 133) as having, in all probability, been bred from buffalo-horns brought from Singapore.

Mr. Stainton remarked that it would be interesting to know whether these *Tineæ* fed on the horns or hoofs of *living* animals. He believed Lord Walsingham had prosecuted enquiries on the subject with at present a negative result.

The Secretary read a letter received from the Colonial Office relative to the appearance of *Phylloxera vastatrix* on the vines of Victoria, also a letter addressed to the Colonial Office, from the Royal Gardens, Kew, by Mr. W. T. Thiselton Dyer, on the subject, and laid the minutes of evidence taken by a select committee of the Legislative Assembly, received as an enclosure, on the table.

The President stated that this communication had been considered by the Council of the Society, and they had resolved that Messrs. Trimen, McLachlan, and Fitch be appointed a Committee to investigate the matter and report.

Mr. Arthur G. Butler communicated a continuation of his "Descriptions of new Genera and Species of Heterocerous Lepidoptera from Japan," treating of the *Noctuæ*.

Mr. Roland Trimen read a "Note on the capture of the paired sexes of *Papilio Cenea*, Stoll (*P. Merope*, auct.), in Natal," and exhibited the specimens, which had lately been received from the captor, Col. Bowker.—E. A. FITCH, *Hon. Sec.*

NOTICES OF NEW BOOKS.

The Cat: an Introduction to the Study of Back-boned Animals, especially Mammals. By ST. GEORGE MIVART, Ph.D., F.R.S. 8vo, pp. 530, with 200 illustrations. London: Murray. 1881.

THE theatre-going portion of the British public has for some months past been exercised in mind in attempting to solve the question, "Where is the Cat?"

The query, "what is a Cat?" propounded by Professor Mivart in this his most recent work, is by no means so easy of solution. Indeed, to answer it satisfactorily involves an explanation which occupies more than 500 closely printed pages! To what end, it may be asked, is so long a discourse directed, and why has the author selected for his theme so familiar an animal as the Cat? These questions are answered by anticipation in the Preface.

The natural history of animals may be written in two ways. They may be treated as one whole, their various powers and the more general facts as to their organisation being successively pourtrayed as they exist in the whole series; or one animal may be selected as a *type* and treated of in detail, other types successively more divergent in structure from the first being described afterwards. In following the latter mode we may either begin with one of the most simply organised of living creatures, and gradually ascend to the highest and most complex in structure; or we may commence with the latter, and thence descend to the consideration of the lowest kinds of animated beings. Professor Mivart has followed the latter course.

The bodily structure most interesting to man, his own, was the first studied (directly or indirectly), and the names now given to different parts of the body in the lower animals have been mainly derived from human anatomy. The descending course is also that which seems on the whole preferable, for, by commencing with the class of animals to which man belongs, we may proceed from the more or less known to the unknown, and from that which is comparatively familiar to that which is strange and novel.

Having then chosen to begin the study of animals with that class to which we belong, it might perhaps be expected that man himself might be selected as the type, but, as the author points out, a fresh description of human anatomy is not needed, and would be comparatively useless to those for whom this work is intended, namely, persons who are interested in the zoology of beasts, birds, reptiles, and fishes, but who are not concerned in studies proper to the medical profession.

The problem then has been to select as a type for examination and comparison an animal easily obtained and of convenient size, —one belonging to man's class, and one not so different from him in structure but that comparison between it and him may readily suggest themselves to the student.

In the common Cat we have just such an animal as is required for the purpose, and by studying its zoology, as taught by Professor Mivart, the student will obtain the knowledge of anatomy, physiology, and kindred sciences necessary to enable him to study profitably the whole class to which it belongs—the class of *Mammals*.

In order to give an idea of the scope of the work, and of the thorough manner in which all the details have been treated, we need only refer to the headings of the chapters, which are as follow:—The Cat's general form; the Skin and its Appendages. The Skeleton of the Head and Trunk. The Skeleton of the Limbs. The Muscles. The Alimentary System. The Organs of Circulation. The Organs of Respiration and Secretion. The Nervous System and Organs of Sense. Development. Psychology. Different kinds of Cats. The Cat's place in Nature, and the Pedigree and Origin of the Cat.

To the general reader, no doubt the two most interesting chapters will be those on the origin of the domestic Cat, and on the different kinds of Cats. In the first of these Professor Mivart favours the opinion that our domestic Cat is of Egyptian origin, and quotes some interesting notices illustrative of its great antiquity. He rejects the view that it has descended from the European Wild Cat, now rarely met with in the British Islands, for, he argues, had this been so, it would have been easily procurable, and would not have been so highly valued as it was even so late as a thousand years after the Roman invasion. For, while the domestic Cat was rare and therefore precious, the Wild Cat continued to be common during the Middle Ages.

With regard to the present existence and distribution of the Wild Cat in the British Islands, we have no doubt Professor Mivart would have modified some of the views which he has expressed had he perused the statistics on the subject recently published by Mr. Harvie Brown in this Journal.*

We cannot concur in the opinion that the stories of Wild Cats in Ireland (where *Felis catus* is unknown) probably refer to the progeny of domestic Cats run wild; for we are satisfied from all we have heard and read on the subject that the Irish Wild Cat, so called, is the Marten. *En passant*, we may point out a mistake which occurs in a foot-note on page 6. It was not Mr. Mills but Mr. A. H. Cocks who succeeded in getting the wild and domestic Cat to breed together in confinement, and who ascertained the curious fact that the period of gestation in the Wild Cat is sixty-eight days, or twelve days longer than the ordinary gestation

* 'Zoologist,' 1881, pp. 8—23.

of a tame Cat,* a circumstance which is the more remarkable as there is little doubt that the two forms can interbreed freely.

Some popular fallacies regarding Cats are summarily disposed of by Mr. Mivart, and some curious facts mentioned. For instance, it is commonly believed that in the Isle of Man the Cats have no tails. It would be more correct to say that *some* Cats there have no tails, and in this breed the hind legs are relatively long. Mr. Jenner Weir saw one which had the fore legs so short as to be useless in walking, and the animal sat up like a Kangaroo. In the Museum of the Royal College of Surgeons is a skeleton of a Cat which was born without any fore-limbs, and yet could jump so well as to be able to leap upon a table. All the bones of the fore-limbs are entirely wanting, except the shoulder-blades. But there are plenty of Cats with tails in the Isle of Man. Mr. Bartlett has measured many in the island, and found them of all lengths up to ten inches.

Another popular story is that in China there is a breed of Cats with pendant ears, but this turns out to be not the fact. Père David, who has travelled so much in China, repeatedly sought to find such an animal, but was never able to see any, or even to learn that they existed.

Although the differences between the various breeds of the domestic Cat are very slight compared with those between different races of dogs, still very distinct varieties exist, but their distinctions repose chiefly on the colour and length or quality of the fur, and not on differences of form such as those we find existing between the greyhound and the pug, the spaniel and the mastiff.

On the different *species* of the genus *Felis*, Professor Mivart has a very interesting chapter (pp. 390—439), illustrated with portraits of many of them, and skulls of several fossil forms. Fifty different species are recognised, their distinguishing characteristics pointed out, and their geographical distribution briefly sketched. This is a very useful chapter, and will be perused with advantage by all who desire to possess some knowledge of such an important group of Mammals as the Cats, but who may not care to enter upon the details of anatomy and physiology with which the work is chiefly occupied.

* 'See 'Zoologist,' 1873, p. 3574, and 1876, pp. 4867 and 5038.

It is impossible to review the present volume without being struck at the amount of thought and labour which must have been bestowed on its production. If it be true, as it undoubtedly is, that the careful study of a succession of types belonging to different families will do more to further the progress of Biology than any other course of study that could be adopted, students have every reason to be grateful to Mr. Mivart for this important monograph, in which the natural history of the Cat as the type of a back-boned animal has been so clearly and ably demonstrated.

The Seals and Whales of the British Seas. By THOMAS SOUTHWELL, F.Z.S. Sm. 4to, pp. 128, with illustrations. London: Jarrold & Sons. 1881.

It is perhaps no exaggeration to say that 999 people out of every 1000 know nothing about Seals and Whales, have no opportunities of observing them, and perchance have never seen representatives of either, except in some aquarium or zoological gardens. For such persons the sources of information at present available are limited and not wholly satisfactory. It is true that certain species of Seals and Whales may be found represented in most museums of importance, but they are not always good specimens, nor invariably well preserved; while, without an adequate series for comparison and study, or an explicit and reliable text-book to guide one in the determination of the genera and species, it is impossible to gain much knowledge on the subject.

Of text-books there is a noticeable scarcity, although many valuable and important memoirs are scattered throughout the publications of scientific societies, or printed in volumes beyond the reach of the general public.

The best account of British Seals and Whales hitherto available is that contained in the second edition of Bell's 'British Quadrupeds,' a work to which Mr. Southwell has naturally turned, as embodying almost all that was known on the subject at the date of its publication in 1874. Taking this work as his model, Mr. Southwell has carefully collected the latest records of the occurrence of Seals and Whales on the British coasts, and

substituting, where possible, better figures of some of the species, has produced a very useful handbook on the subject.

The claims of certain species, such as the Greenland and Bladder-nosed Seals, to be considered British have been strengthened by the production of additional evidence of their recent occurrence here, and the author makes out a very good case on behalf of the Atlantic Right Whale (*Balæna biscayensis*), which he considers is occasionally met with in British waters, and which has in all probability been mistaken for the Greenland species, *Balæna mysticetus*. He gives a new figure of this, or at least a figure that will be new to most English readers, being a reduced copy of the coloured plate in Capellini's memoir on a Whale of this species which was captured in the Bay of Taranto in February, 1877. As the original of this plate was a carefully executed water-colour drawing made from the animal itself, it may be regarded as the most reliable figure of the species at present obtainable.

Some of Mr. Southwell's chapters strike us as being not so complete as they might be made. Such, for instance, are the chapters on the Beaked Whale, *Hyperoodon rostratus*, and the Broad Fronted Beaked Whale, *H. latifrons*. In 'The Zoologist' for 1878 (pp. 13--15) is a detailed description, with accurate measurements, by Mr. Henry Lee, of a specimen of the former species, which was killed in the Menai Strait in September, 1877. This account, it seems to us, might have been quoted with advantage by Mr. Southwell, since it embodies many details of interest which he has not noticed.

Again, we remark that several of Mr. Southwell's descriptions are too brief to enable an identification of the species. This is to be regretted, for, as the volume is exclusively devoted to British Seals and Whales, it would have been easy to make it so complete as to render it practically unnecessary for the student to refer to other sources of information.

Nevertheless, Mr. Southwell has brought together, in a convenient form, a good deal of interesting information about our marine mammalia, which, it may be hoped, will have the effect of stimulating further enquiry and observation of the habits of many species about which we have still much to learn.

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EXTINCT BRITISH QUADRUPEDS.*

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THE extinct animals of Great Britain may be divided into two classes:—those which lived in such remote times that the only proof of their former existence here lies in their fossil remains, which have been from time to time discovered; and those which have survived to within such a comparatively recent period that of their former existence here we have historical as well as geological evidence. It is of the latter class only that I now propose to treat, conceiving that for several reasons they will possess a greater interest for most people.

In the first place, it adds much to the attractiveness of the subject if from an examination of ancient records, charters, chronicles, court rolls, and such documents bearing on the subject as have been preserved to us, we are enabled to gather some account of these animals from the lips, as it were, of those who were contemporary with them, who saw and hunted them, and who are able to tell us something of the causes which led to their extermination. In the next place, when we consider that the particular species now referred to, although long since extinct in Great Britain, are still to be found in many parts of the Continent, and have their living representatives in the Gardens of this Society, there seems an additional interest in learning something about them. As we walk round these Gardens, and

* An abstract of one of the "Davis Lectures," delivered at the Zoological Gardens, June 30th, 1881.

view such creatures as the Brown Bear, the Wolf, the Wild Boar, the Beaver, and the Reindeer, it is a curious reflection that they were all formerly denizens of this country, and must at one time have been very numerous here. In what localities and under what conditions they existed, by whom they were hunted, and how they gradually became exterminated, are topics which seem well worth investigation.

With regard to their former haunts, I will ask you to glance at the series of maps before you, on which I have indicated by patches of colour the various localities in which their remains have been exhumed, or which we know from history were frequented by them. These will enable you, in much less time than I could give the details, to form a good notion of the former distribution of these animals in the British islands, premising only that the distribution here indicated affords merely an approximative view of the existing state of things some centuries ago—say at the date of the Norman conquest; for while only those localities are indicated which are known with certainty to have been the former haunts of the animals in question, there are doubtless very many others which were at one time frequented by them, but concerning which at present we have no information.

To realise the conditions under which such animals as the Bear, the Wolf, and the Wild Boar existed in England, it is necessary to consider the aspect of the country when they were denizens of it, and the great physical changes which have since taken place. To go back no further than the date of the Norman Conquest, more than half the country was at that time covered with forest, which stretched uninterruptedly for miles and miles through several counties without a break. Through the greater part of these there were no roads, and we may therefore easily conceive what impenetrable strongholds they afforded to the animals in question. One of these, however, the Bear, was in all probability at this time extinct, for I have been unable to find any historical evidence of its existence here after the Conquest; but the Wolf and the Wild Boar held their ground for many centuries later, as we shall presently see.

Not content with the vast extent of forest which he found existing here on his arrival, William the Conqueror appropriated for the chase large tracts of land, much of which had been

already reduced to cultivation, and reconverted it into forest; and his example was followed by Henry II., Richard I., and John, all of whom enforced such stringent and arbitrary forest laws as to cause the greatest possible ill-feeling and discontent throughout the land. Everyone knows how this culminated in open rebellion, and how eventually a remedy was obtained in the shape of the Great Charter, and the Charter of the Liberties and Customs of the Forest. A few years later, when Henry III. confirmed the Charter of the Forest, he directed that all the ground which had been added to the ancient forests by his predecessors should be disafforested and restored to rightful owners.

From that time to the present the forests have become gradually reduced in extent, until, instead of extending for sixty or seventy miles at a stretch, they dwindled down to mere remnants of perhaps not more than six or seven miles diameter.

In Henry VIII.'s time a good many ancient forests were destroyed, particularly in the north of England. James I. sold and gave away a great many of the royal forests, which were gradually reduced in area, and some of them entirely cleared. Towards the end of the sixteenth and beginning of the seventeenth centuries large tracts of forest, pine, birch, and oak, in Scotland, were purposely set on fire and burnt down, in order to destroy the wolves with which they were infested.

Thus we see how the old forests gradually became split up into mere remnants of their former greatness, which remnants at the commencement of the present century were found to be sixty-nine in number, with thirteen chases and upwards of 750 parks.* It is easy to understand how this breaking up of the forest land into patches led to the destruction of the wild beasts in its recesses; for so long as they could keep ahead of their pursuers through interminable tracts of forest, they were in no immediate danger of becoming extinct; but so soon as large tracts of cleared and cultivated ground intervened between their strongholds, they were more easily surrounded and destroyed. When, in addition to these facilities for hunting, Acts of Parliament were passed which provided that rewards should be paid for their destruction, their doom in a few years was sealed.

* In Domesday thirty-one parks only are mentioned.

This of course applies only to the forest animals, as the Wolf and the Wild Boar, the Roe, the Wild Cat, and the Marten, of which all except the last-named are now extinct in England. The Bear, as already remarked, had become extinct at a much earlier period, namely, before the Conquest, while the Beaver and the Reindeer, as we shall presently see, were to be found in very different haunts.

That Bears were at one time common in Britain is clearly testified by the abundant remains which have been discovered from time to time in various parts of the country, not only in England and Scotland, but also in Ireland.

With regard to Ireland, however, it should be observed that in the opinion of palæontologists it is doubtful whether any of the Ursine remains there discovered are referable to *Ursus arctos*, the common Brown Bear, a comparison of the osteological and dental characters indicating that they belong to a much older and prehistoric form, *Ursus fossilis*, the progenitor apparently of the existing *Ursus ferox*.

The relationship, however, between *Ursus ferox*, the Grizzly Bear now repelled to Western North America, and *Ursus arctos*, the Brown Bear, is so close, not only as regards fossil, but also recent individuals, that externally they are indistinguishable.

From an old Welsh MS. relating to ancient British laws and customs, discovered by a friend of the illustrious John Ray, it appears that the Bear was formerly reckoned amongst the beasts of chase in this country, and its flesh was esteemed equally with that of the Hare and the Wild Boar. Many names of places in Wales still indicate its former existence there. That it was killed and eaten by the Romans during their occupation of Britain we know, from the discovery of its remains in some of their refuse heaps, as at Colchester, and Richmond in Yorkshire. And not only did they chase and kill bears here for sport as well as for food, but they exported them to Rome, as we learn from Martial and Plutarch, for the purpose of tormenting malefactors and for exhibition in the Roman arena. These are referred to as Caledonian bears, and Scotland appears to have been the great stronghold for them, at least during the later years of their existence in Britain. Bishop Leslie (1578) states that the Caledonian forest was once full of them, and Camden, our great antiquary, writing of Perthshire, particularly refers to this immense

wood, "dreadful for its dark intricate windings, and for its dens of bears." That these animals existed in Britain during the eighth century is to be inferred from a reference made to them in the "Penitientiale" of Archbishop Egbert, which was drawn up about A.D. 750, and even in the time of Edward the Confessor, nearly three centuries later, it would seem that they were still to be found here (although doubtless in greatly diminished numbers), for we learn from Domesday that the town of Norwich furnished annually one Bear to the king, and six dogs for the baiting of it.

I have been unable to find any evidence of Bears in any part of the British Islands at a later date than this, although it has been frequently stated, on the authority of Pennant, and is generally believed, that the last British Bear was killed in Scotland in 1057 by a member of the Gordon family, who, in reward for his valour, was directed by the king to carry three bears' heads on his banner.

This, however, is altogether a fallacy. Pennant quoted from a translation* of a Latin manuscript history of the Gordon family, a copy of which is preserved in the Advocates' Library at Edinburgh, and reference to the original Latin shows that the animal slain by the Gordon in question was not a Bear, but a Boar (*immanem aprum*). There being a difference of only one letter in the name, it is easy to understand how the mistake arose.

It is not so easy to realise the fact that the Beaver was once a native of the British Islands, so utterly unsuited to its habits does the country appear at the present day. That it once existed here, however, is indisputable, for, in the first place, we may see in various museums the skulls and other portions of the skeletons of Beavers which have been exhumed in different parts of England and Scotland; and in the next place, we have fortunately preserved to us the testimony of those who lived contemporaneously with them, and who had opportunities of observing them in their natural haunts.

A glance at the map (above referred to) will show where remains of the Beaver have been found, and it will be observed that the localities are pretty widely scattered.

Just as the Beaver is still trapped in the New World for the sake of its fur, so, for the same reason, used it to be hunted in

* Published in Edinburgh in two vols, 1726.

Britain in the tenth century. We learn from the code of Welsh laws made by Howel Dha, A.D. 940, that at that date the Beaver was one of the animals of whose fur the king's garments were made, the fur of the Marten and Ermine being also employed, and that the value of a Beaver's skin was fixed at 120 pence, that of a Marten being only 24 pence. This shows that even at that period the Beaver was considered rare. But although scarce, it had not become extinct in Wales even 250 years later. For in 1188, when Giraldus Cambrensis travelled through Wales, in company with Baldwin, Archbishop of Canterbury, he found Beavers in the River Teivi, in Cardiganshire, and in the 'Itinerary' which he wrote, and which has fortunately been preserved to us, he has left a curious account of their habits, derived partly from report and partly from his own observation. His description of the animals and of their mode of building their "castles," as he terms them, with great boughs which they cut with their teeth, leaves no room for doubt that it was the Beaver and not the Otter to which he referred.

The Welsh had two names for it, *Avanc* or *Afanc*, signifying "river-dog" and *Llostlydan* or "broad-tail," and there are several places not only in Cardiganshire, but also in Montgomeryshire and Caernarvonshire, which are named after the Beaver, the Welsh names signifying "the Beaver's Pool," "the Beaver's Dam," and "the Vale of the Beavers."

The Highlanders, too, had a peculiar name for the Beaver, namely, *Losleathan*, or *Dobhran losleathan*, the Broad-tailed Otter; and the tradition current in some parts of Scotland, that it formerly existed in that country, is confirmed by the discovery of its remains in various Scottish localities. Giraldus, indeed, in 1188, had heard of the alleged existence of Beavers in one river in Scotland, but was informed that they were then very scarce there.

Some confirmatory evidence of their presence in Scotland about that period is afforded by the fact that in the enumeration of furs upon which duty had to be paid on exportation at Scotch ports, in the reign of David I. (1124—1153), besides Fox, Stoat, or Ermine, Marten, and Wild Cat, mention is specially made in all the MSS. of the skins of Beaver and Sable, the latter being probably the Polecat. And among the export duties licensed to be levied at Newcastle-on-Tyne in the time of Henry I.

(1100—1137), we find the *tymbra beveriorum* fixed at fourpence.

When the Beaver became finally extinct in the British Islands is uncertain, and perhaps impossible to discover; but Boethius, writing in 1526, enumerates *fibri* or Beavers amongst the *feræ naturæ* of Loch Ness, whose fur was in request for exportation towards the end of the fifteenth century.

From that time until the present there is a blank in the history of British Beavers, and although it is not at all probable that we shall ever see Beavers again in a wild state in this country, it is interesting to note the success which has attended the experiment made by the Marquis of Bute, who within the last few years has turned out some imported Beavers in the Isle of Bute, where they have not only thriven and done well, but have increased and multiplied.

In connection with the subject of their increase in this country, it may be noted that in the gardens of this Society the Beavers have bred several times, and between the years 1871 and 1874 several young ones were reared.

Another animal to be seen in the Gardens of this Society—the Reindeer—is of special interest as having been once a native of the British Islands. There is abundant proof of its former existence here in the quantity of horns, skulls, or other portions of the skeleton which have been brought to light at various times in different parts of the country.

This animal must have been one of the earliest arrivals on British soil after the ice and snow of the glacial epoch began to disappear, and it is in caverns and river gravels and sands of past glacial ages that we first meet with its remains. Its abundance in British deposits of this date is very remarkable. Professor Boyd Dawkins has found portions of its bones and horns in no less than thirteen out of twenty-one caverns examined by him, while the Red-deer was found only in seven; thus, contrary to what is generally assumed to be the case, the Reindeer predominated in numbers over the Red-deer at the time the British bone caves were being filled.

In the post-glacial river deposits the same preponderance of the Reindeer is observed. It has been found in the gravels of Brentford, in a railway cutting at Kew Bridge, and higher up the Thames in a gravel bed at Windsor, where, in the spring of 1867,

numerous remains were discovered, evidently swept down by the current from some point higher up the river.

It will be seen from the accompanying map how generally distributed this animal was at one time, not only in England, but also in Scotland and Ireland.

During the arctic severity of the past glacial climate the remains of the Red-deer were rare, while those of the Reindeer were most abundant. During the prehistoric period the Red-deer gradually increased in number, while the Reindeer as gradually became extinct. In its rarity in the latter epoch we have proof of the great climatal change that had taken place in France and Britain.

The last haunt of the Reindeer in the British Islands, so far as can now be ascertained, appears to have been the lonely lichen-covered hills of Caithness, where, as we learn from an Icelandic Saga, it used to be hunted in the twelfth century by the jarls of Orkney, who were in the habit of crossing over the Pentland Firth for the purpose every summer.*

Although this assertion rests only on the authority of the author of the 'Saga' referred to, there is nothing improbable in it. He must have been well acquainted with the animal himself. The hills of Caithness lie in the same parallel of latitude as the South of Norway and Sweden, where the animal was living at the time, and its food, the brushwood, and especially the Reindeer-moss (*Cladonia rangiferina*), is still found extensively over Scotland.

There is another point worth notice, as remarked by Professor Boyd Dawkins. The Reindeer is mentioned in the 'Orkneyinga Saga' along with the Red-deer. At the present day these animals occupy different zoological provinces; so that the fact of their association in Caithness would show that in the twelfth century the Red-deer had already appropriated the pastures of the Reindeer, which could not retreat further on account of the sea, and was fast verging on extinction. From Linnæus's time down to the present day, even in Sweden and Norway, it has been retreating farther and farther north.

* The 'Orkneyinga Saga' quoted by Torfæus in his 'History of Orkney,' and edited by Jonæus in 4to, 1780. The jarls of Orkney referred to (Rognvald and Harald), according to Jonæus, hunted in Caithness in 1159.

I fear that time will not permit me to say much of the experiments which have been made from time to time to re-introduce the Reindeer in this country. They have been frequently imported and turned out in what appeared to be situations suited to their habits, where suitable food also was to be obtained, but from some cause or other they have never lived very long.

In the Gardens of this Society they have thriven very well. In March, 1878, two female Reindeers were received in exchange, and in May of the same year two young ones were born. At the present time there is one to be seen in one of the paddocks on the bank of the canal beyond the Elephant house.

In the Wild Boar we have an animal which for several centuries later held its ground in England in spite of the adverse circumstances by which it was surrounded, and which eventually brought about its extinction. This was owing partly to its being a forest animal (and there was still forest enough in many parts of the country to afford it concealment), and partly to the fact that, being a beast of chase, it was for a long time protected to a great extent by those who delighted in Boar-hunting: that is to say, that while they hunted and killed individual boars from time to time for their own amusement, they allowed no one else to do so except in their company, and the laws relating to trespass in pursuit of game were very stringent.

As might be expected, we find records of the chase of the Wild Boar in England at a very early period; and even before the date of such records figures of the animal appeared on ancient British coins and Celtic works of art, showing that it was one of the oldest forest animals in Britain. The Romans, who hunted it here, whenever an extraordinary large and savage Boar was killed, were in the habit of erecting memorial stone altars, which they dedicated to the god Sylvanus out of gratitude for the death of the monster. This we know from the discovery of several such altars, or the remains of them, bearing inscriptions (in some cases nearly perfect) which explain their history.

Time will not permit me to enlarge upon the curious representations of Wild Boar-hunting which appear upon Saxon MSS., Roman tablets, and Norman sculptures, and which are as interesting to the naturalist as they are to the archæologist. It must suffice if I refer briefly to a few of the more curious episodes in the history of the British Wild Boar from the time

when the Welsh King, Howel Dha, in the tenth century, framed his code of forest laws, and provided that the Wild Boar should be hunted in the month of November, until the time when it became actually extinct about the middle of the seventeenth century.

There is a story told of Edward the Confessor's time, apparently well authenticated, to the effect that in the Forest of Bernwood, in Buckinghamshire, a large Boar, which had killed many an assailant and done much damage, was at length slain by a huntsman named Nigell, who was rewarded by the King with a present of land, upon which he built a house, which he named Boarstall, and this property has descended through the Nigells to the Aubreys, in whose possession it remains at the present day.*

William the Conqueror, who spent the greater part of his time in hunting, especially in the great forests of Sussex, Hants, and Wilts, was so addicted to Boar-hunting that he punished with loss of eyes any unauthorised person who should slay a Boar.

Henry I. also was very fond of Boar-hunting, and both he and his immediate successors were in the habit of making grants of land in different parts of the country to sportsmen in consideration of their undertaking to keep a certain number of Boar-hounds and Wolf-hounds for the King, or to supply him with horses and Boar-spears whenever he came to hunt in their neighbourhood.

Edward the Third used to hunt the Wild Boar in Oxfordshire, near Blechesdon, and whenever he went to stay at Cornbury Park, in that neighbourhood, was always provided with Boar-spears and well-trained hounds.

The form of the spear seems to have varied at different periods. It was originally a stout broad blade, but was afterwards made with two or three sharp forks or prongs, which were thought to be more effectual in preventing the Boar from breaking through upon the huntsman. The mode of hunting generally adopted was to track the Boar to its lair, to rouse him, and hunt him till the hounds brought him to bay, and then to ride in and

* 'Archæologia,' vol. iii., pp. 3, 15; and Blount's 'Ancient Tenures,' p. 242 (ed. 1815).

spear him, or dismount and despatch him, single-handed, with a sword. The latter feat, when successfully accomplished, of course brought the greatest credit to the huntsman.

There is a curious story recorded in connection with a Boar-hunt which took place in Yorkshire in the time of Henry II. It appears that three gentlemen, whose names are given, William de Bruce, Ralph de Percy, and a freeholder in the neighbourhood of Whitby, named Allotson, met on the 16th October, 1159, to hunt the Wild Boar in a certain wood called Eskdale-side, belonging to the Abbot of Whitby. After a bit their hounds found an old Boar, which they hunted for some time, and ran him very hard towards a chapel and hermitage tenanted by a solitary monk of Whitby, who was a hermit. The Boar, being hard pressed, took in at the chapel door, laid him down, and there died. The hermit, being a humane man, shut the door to keep out the hounds, and went on with his meditations. Presently the huntsmen arrived, and, finding the hounds checked, made a cast right and left to recover the scent, never dreaming that the Boar was in the chapel; but the hounds, persistently refusing to leave the door, they broke it in, and, to their astonishment, there lay the Boar dead. The story goes that, being very angry at their hounds being checked, they went at the hermit with their Boar-spears, and wounded him so seriously that a few weeks afterwards he died. In the meantime the affair came to the ears of the Abbot of Whitby, who, being in great favour with the king, refused to allow them to take sanctuary at Scarborough, whither they had fled on hearing how the matter was likely to end. Having lost their privilege of sanctuary, they were liable to the extreme penalty of the law. Fortunately, however, the hermit interceded with the Abbot in their behalf, and a pardon was obtained on condition of their performing a certain penance, which was then and there enjoined them.

Boar-hunting was at one time such a matter of every-day occurrence, that those who participated in it, or witnessed it, seldom took the trouble to preserve any record of their sport, except when, in a case like that just mentioned, some unusual circumstance occurred to make the day memorable. But in the old Household Books, which were kept by the stewards of noblemen and gentlemen of position, we frequently find entries of payments made in connection with the sport, often in the shape

of rewards paid to keepers and beaters when the king came to hunt in their neighbourhood. Thus, when Henry VIII. visited Edward Seymour, afterwards Earl of Hertford, at Savernake, in Wilts, Wild Boars were killed in Savernake Forest, and the Household Books of that period (1539—1543) show the sums that were paid in connection with the sport.

When James I., in 1617, visited Sir Richard Hoghton at Whalley, in Lancashire, he was regaled with, amongst other things, "Wild Boar pye." In the same year the king hunted the Boar in Windsor Forest, as we learn from a letter addressed to Sir Thomas Puckering by a gentleman who had just brought all the news from the Court, then held at Hampton.

The exact date when the Wild Boar became extinct in Great Britain is not easy to discover. Wild swine are casually referred to in an old account book kept by the steward of Earl Ferrers as existing at Chartley, in Staffordshire, in 1683, and this is the latest date at which I have been able to find any mention of the animal. It is quite possible that it may have lingered on in the northern parts of our island until the close of the seventeenth century. There are many local traditions which fix its extermination about this date. For example, in Westmoreland it is asserted that the last Wild Boar was killed about 200 years ago near Staveley, in that county, by a man named Gilpin, the spot being still marked by an inn known as the "Wild Boar Inn," and the bridge over the beck called Gilpin's Bridge.

It is also very probable that just as the Wolf survived in Scotland and Ireland to a very much later period than it did in England, the Wild Boar may also have lingered on in some of the great forests with which parts of Scotland and Ireland were clothed during the last century; and we know from various fragments of evidence, both geological and historical, that in both these countries Wild Boars were once very numerous. Many localities still indicate, by the names they bear, particular parts of the country where the animal was formerly common; and this is not only the case in England, but also in Scotland and Ireland.

Several attempts have been made at various times to re-introduce the Wild Boar in this country, notably in the New Forest, Wolmer Forest, at Charborough Park, Dorsetshire; in Essex, in the woods between Mersey Island and Colchester; at Chartly

Park, Staffordshire, and in Derbyshire; but none of these attempts resulted in the re-establishment of the species in England, much to the satisfaction probably of all but the few enthusiastic sportsmen who were bold enough to make the experiments referred to.

We come now to the Wolf, which was the last to disappear of those animals which are now extinct in the British Islands, and on this account partly the materials for its history as a British animal are more complete than is the case with any of the others.

The researches of geologists have brought to light its fossil remains in various parts of the country, and it is evident that at one time there was perhaps scarcely a county in England and Wales in which Wolves did not abound, while in Scotland and Ireland they must have been even still more numerous.

The vast tracts of unreclaimed forest land which formerly existed in these realms, the magnificent remnants of which in many parts still strike the beholder with awe and admiration, afforded for centuries an impenetrable retreat for these animals, from which it was well-nigh impossible to drive them. It was not indeed until all legitimate modes of hunting and trapping had proved in vain, until large prices set upon the heads of old and young had alike failed to compass their entire destruction, that by cutting down and burning whole tracts of the forests which harboured them, they were at length effectually extirpated.

It is currently believed that in England the Wolf was completely exterminated by King Edgar, who, by relinquishing the fine of gold and silver imposed upon the Welsh princes by his uncle Athelstane after the battle of Brunanburgh, in 938, and exacting in its stead the annual production of 300 Wolf skins, is said to have killed them all off in four years. But this, if true,* must be taken to apply only to Wales, not only because the Welsh chieftains had no authority to hunt out of their own dominions, but because there is abundant documentary evidence to prove that Wolves existed in England for at least five hundred years later, while in Scotland and Ireland, as we shall presently see, they survived even to a still later date.

* Owen, in his 'Cambrian Biography,' states that it was not until *forty-five* years after the edict of Edgar that the last Welsh Wolf was slain.

Wolves are expressly mentioned in the Forest Laws of King Canute, and Liulphus, a dean of Whalley in the time of Canute, was celebrated as a Wolf-hunter at Rosendale, in Lancashire.*

Upon many an English battle-field, at the period of the Norman Conquest, as we learn from incidental remarks in the old chronicles, the bodies of the slain were preyed upon by Wolves.

Henry II. and John both hunted the Wolf in various parts of England, and kept regular establishments for the purpose, paying large prices for good Wolf-hounds, and liberal wages to "the keepers of the King's Wolf-hounds," as they were called.

In Henry III.'s reign Wolves were sufficiently numerous in some parts of the country to induce the king to make grants of land to various individuals upon the express condition of their taking measures to destroy these animals whenever they could be found; and Edward I. formally appointed Sir Peter Corbet to be Wolf-hunter-in-chief, commissioning him to destroy all the Wolves he could find in the counties of Gloucester, Worcester, Hereford, Salop, and Stafford. When he died, in 1301, his hounds were all brought to the king, and there is an entry to be found in the Wardrobe Accounts of this reign (preserved amongst the additional MSS. in the British Museum), showing the payment of a reward to the huntsman who brought them.

Towards the close of that century, in Richard the Second's reign, Wolves must have been still pretty common in some parts of the country, as, for example, in Yorkshire; for in the Account Rolls of Whitby Abbey at that period we find entries of payments made for curing and dressing Wolf-skins; and in the Accounts of Bolton Priory are entries of rewards paid for killing Wolves in the Craven district.

During the reign of Henry VI. it appears that grants of land were still made on condition of destroying the Wolves in certain localities where they still lingered, as in the Forest of Sherwood, but they were then getting very scarce, and the last in England was probably killed in Henry the Seventh's reign, when a member of the Barnes family earned a reputation as a noted Wolf-hunter in Durham.

The old books on hunting state that the season for Wolf-hunting was between the 25th December and the 25th March.

* Whitaker's 'History of Whalley,' p. 222.

This, of course, was only so long as Wolf-hunting was an amusement and a royal sport. As soon as it became a necessity, and a price was set on the animal's head, it was killed whenever and wherever it could be found.

The price paid for Wolves' heads in Ireland during Cromwell's protectorate was something considerable. By an Order in Council, dated at Kilkenny, April, 1652, the exportation of Wolf-dogs was prohibited, and the following year another Order in Council directed that whoever should capture or kill a Wolf and produce the head should receive, from the Commissioners of Inland Revenue, £6 for a bitch-wolf, £5 for a dog-wolf, £2 for a full-grown cub, and 10s. for a young one.

It would naturally be supposed that the offer of so high a reward would speedily bring about the extermination of the last Wolf in Ireland, but it was not so; great numbers were killed, but numbers still survived, so much so, that even ten years later, as appears by the Journal of the House of Commons, Sir John Ponsonby reported, from the Committee of Grievances, that a Bill should be brought in to encourage the killing of Wolves and Foxes in Ireland.

In 1700 there were still Wolves in the great woods of Shillela between Carlow and Wicklow, and in 1710 rewards were paid for the destruction of some in Kerry. Richardson, the author of a work on "The Dog, its Origin, Natural History, and Varieties," knew an old gentleman, in 1841, whose mother remembered Wolves to have been killed in Wexford between the years 1730—40; and Sir J. Emerson Tennant was informed by the Very Rev. Holt Waring, Dean of Dromore, who was born in 1766, that he perfectly well recollected, when he was a boy, a foal belonging to his uncle being killed at Waringstown, Co. Down.

This places the extinction of the Wolf in Ireland at a much later date than is currently accepted; and the same may be said of Scotland, for, although one of the last Wolves in Scotland was killed more than twenty years before it became extinct in Ireland, this was more than sixty years after the date fixed by Pennant for its extirpation in Scotland. His statement that the last of its race was slain in 1680 by Sir Ewen Cameron, of Lochiel, must be taken to refer only to that particular district in which Sir Ewen Cameron lived, and not to the whole of Scotland, for

several were killed in other districts at subsequent dates up to 1743, when the last in Inverness and (as there seems every reason to believe) the last in Scotland was killed at a place between Fi-giuthas and Pall-a-chrocain, amongst the wilds of the Monaidh-laith mountains.

Thus, in spite of the many Acts of Parliament which were passed to effect the destruction of Wolves in Scotland;* in spite of the numerous grants of land that were made on the express condition of killing Wolves; in spite of the large tracts of forest which were cut down or burnt at the end of the sixteenth and beginning of the seventeenth centuries, on purpose to get rid of these animals; and in spite, moreover, of the rewards which were constantly being paid for their destruction, it was not until 150 years ago, practically, that the object was finally accomplished.

Now, to what conclusion does this lead us? In the earliest times of which history takes cognisance, when this country was for the greater part either dense forest, or fen, or bleak moorland waste, when agriculture was in its infancy, when the lower classes were in the condition of serfs, and those who had wealth spent it in feasting and hunting, the country was overrun with the wild animals of which I have been treating, and which served no other purpose than to furnish amusement and, in some cases, food to those who hunted them.

Gradually, as the forests were cleared and the waste lands cultivated, as the condition of the lower orders was improved, and as they rose from mere tenants-at-will to landowners with vested interests in the soil they cultivated, opposition was made to the summary way in which their land was afforested, and noxious animals preserved which destroyed their flocks and their crops, until at length this state of things was remedied by royal charter. The forest laws were repealed, or considerably mitigated, and the complainants secured against spoliation. All woods that had been taken in, or, as it was termed, *afforested*, to the prejudice of the owners, were *disafforested*, and the owners were no longer compelled to tolerate the presence in their neighbourhood of ferocious animals, and which were then slain wherever and whenever they could be found. It is true they survived in reduced numbers for some centuries later, in

* Acts with this object were passed in 1427, 1457, 1525, and 1577.

consequence of the utter impossibility of dislodging them from the almost impenetrable forests and mountain fastnesses to which they were driven. But the gradual removal of these obstacles, and the insular nature of the country from which they could not escape, finally, and of necessity, brought about their extinction.

The facts thus briefly narrated teach us also something more than this. They show us what a length of time it has taken to eradicate a single species, even in so comparatively limited an area as that of the British Islands, and under circumstances which seemed so favourable to the object in view.

They remind us that now, in our own day, there are species passing away which will sooner or later have to be classed with those I have enumerated. The Roe-deer is already extinct in England, although still common in some parts of Scotland. The Wild Cat has not only been exterminated in England, but is no longer to be found in the south of Scotland, that is to say, not south of a line extending from Oban on the west coast, along the southern and eastern borders of Perthshire, and thence in a north-westerly direction to Inverness.

The Marten, although still to be found in parts of Cumberland and Westmoreland, and in certain districts in Scotland and Ireland, has become so rare as a British animal as to make its occurrence when noted a matter of comment. The Polecat will soon be as rare. All these animals are gradually passing away, and it behoves naturalists, while they have yet the opportunity of so doing, to investigate, each in his own neighbourhood, the life-history and distribution of these particular species, so as to place on record the most interesting facts concerning them, facts which hereafter it may be impossible to obtain. It is scarcely to be expected that any of us will live to hear of the complete extinction of any of the species just named; but when we consider how comparatively little our forefathers did to elucidate the Natural History of the country in which they lived, and how fragmentary still is our knowledge of the wild animals by which they were surrounded, it is to be hoped that we may be able to do more for posterity in this respect than our ancestors have done for us.

In Zoology as in History the value of contemporary records is inestimable.

ON THE HABITS OF THE KEA OR MOUNTAIN PARROT
OF NEW ZEALAND.*

By T. H. POTTS, F.L.S.

IF a stranger accompanied a party of back-country flock-masters or shepherds on a visit of inspection to one of our museums, on looking over the birds of New Zealand, he might feel at a loss to account for the strong interest displayed by the mountaineers in the Kea—a parrot that at a transient glance pretty closely resembles the noisy Kaka (*Nestor meridionalis*), yet one might venture to predict that it would be the first bird inquired for and pointed out, and its destructive habits dwelt upon with startling emphasis.

In the spring-time of 1871, and subsequently, the writer published some brief accounts of the Kea, showing the progress of development in its then newly acquired carnivorous habit.† It is now proposed to give a life-history of the species, and the truest way of doing so will be to refer to one's early acquaintance with it during its age of innocence, before it had acquired that strange Epicurean taste for dainties that has led to the commission of deeds of savage cruelty. We shall thus see the bird harmless enough in the dull epoch of Maori conservancy, later on, unable to restrain its mischievous propensities, when tempted by peaceful flocks of defenceless animals introduced by the "pakeha" into the wild rugged country of its own peculiar range. A wish to render this account as complete as possible must be held as excusing the writer for entering into minute details that to some may appear tedious, but it must be remembered that the subject is one that is no longer of interest only to naturalists; it has grown to be of importance to numbers of mountain sheep-

* *Nestor notabilis*, Gould; the Green or Mountain Parrot; Kea of the Maoris; and Kaieo or Sheep-killer of the shepherds of the Southern Alps.

† See papers read before the Wellington Philosophical Society and the Philosophical Institute of Canterbury, in 'Transactions of the New Zealand Institute,' vol. iii.; 'Journal für Ornithologie,' März, 1872; Dr. O. Finsch, 'Revision der Vögel Neuseelands'; Brehm's 'Thierleben—Vögel,' vol. i., p. 166; 'Nature,' vol. iv., p. 489; 'The Kea—Progress of Development'—'Nature,' vol. v., p. 262; 'Change of Habits in Animals and Plants'; and 'The Zoologist,' 1871, p. 2855; 1880, p. 57.

farmers. The time cannot be far distant when agricultural and pastoral associations will have to take cognisance of the mischievous influence of this savage bird on an important industry that promotes the useful occupation of a considerable tract of country.

Through the kind offices of Mr. Robert Wilkin, the writer has been greatly assisted with valuable information acquired from notes contributed by sheep-farmers, owners of stations, and shepherds on many runs in the southern alpine country. Amongst these Messrs. Thomson, A. M. Clarke, McCallum, Crisp, F. Andrew, and McColl have supplied communications of great interest; their experience on the subject extends over many years; they possess an intimate knowledge of a wide stretch of mountainous land, including the grand and picturesque scenery of the lake district, Te Anau, Wakatipu, Mararoa, Mount Pisa, Motatapu, Overshot, Motukuku, Matukituki, Mount Aspiring, to Ben Ohou, &c. The Kea (or Kaieo) is the name as spelt by some shepherds and flockmasters, and which word perhaps should be used, as it has been adopted by many of those who from the nature of their employment are most likely to take the greater amount of interest in the bird and its mode of life.

The Kea was first made known to science as early as 1856 by the Hon. W. B. Mantell, from specimens which were obtained from the southern alpine country, and the late Mr. Gould described the species under the name of *Nestor notabilis*. A few years later, another good example, astray from the higher ranges, was procured at a sheep station on the Orari, in South Canterbury; the fame of this *rara avis* spread through the province; soon afterwards skins were got from the back-country sheep-runs, and in a short time museums were enabled to enumerate "the green parrot" as one of the choice and rarer articles in their traffic of exchanges.

In order to convey a correct impression of the Kea and its habits, it is necessary to give a brief outline of the features of the country in which it is to be found. We have most frequently observed it above the gorge of the Rangitata, one of the great snow-rivers, as they are termed. This stream, which derives its source from the glaciers which are embedded in the gloomy and secluded fastnesses of the Southern Alps, is periodically swollen by the melting of the snow, and by the heavy rain

from the north-west which falls during the spring and autumn months; fed by numerous creeks and tributaries from every converging gully, its volume increases, it rushes noisily and impetuously over its rough boulder bed, till the junction of the Havelock, the Lawrence, and the Clyde swells its waters into a large river. The leafy, rugged mountains which imprison it present almost every conceivable variety of outline; jagged peaks crowned with snow; countless moraines point out where the avalanche and snow-slip have thundered down into the valley below. The river is bordered here and there by grassy flats, hanging woods of timber trees, in which the brown-tinted *Totara*, the silvery *Phyllocladus* with its purplish points, the small-leaved *Kohai*, and the soft bright foliaged ribbon-wood contrast well with the dusky hue of the dark-leaved *Fagus*; far above, dwarf vegetation in all the wonderful variety of alpine shrubs and flowers, struggles up the steepest slopes, adorning the frowning precipice and foaming cascade, lending its aid in forming scenes of picturesque and romantic grandeur, in which rich and varying tints of perennial verdure gratify the eyes of the spectator with their beauty. This is the home of the Kea—amongst holes and fissures in almost inaccessible rocks, in a region often shrouded with dense mists or driving sleet, where the north-west wind rages at times with terrific violence; here the Green Parrot may be observed, entering or leaving crevices in the rocks, or soaring with motionless wings from peak to peak, far above the screaming Kaka or the chattering Parroquet; the swift-winged Falcon is perhaps the sole intruder in its wild domain. At early dawn its peculiar note is heard, very like the mewing of a cat, though in some of the more secluded gullies it may be noticed throughout the day; it really appears to wake up into activity at dusk, being, to a certain extent, nocturnal in its habits. It is scarcely less gregarious than its congener *N. meridionalis*; in the moonlight nights of winter, numbers have been observed on the ground feeding; it can hardly be deemed an arboreal bird in the strict sense of the term.

The rigour of a hard winter, when the whole face of the alpine country is changed so as to be scarcely recognisable under a deep canopy of snow, is not without its influence on the habits of this hardy bird; it is driven from its stronghold in the rocky gully, and compelled to seek its food at a far less elevation, as its food

supply has passed away gradually at the approach of winter, or lies buried beneath its reach. The honey-bearing flowers have faded and fallen long before; the season that succeeded with its lavish yield of berries and drupes that gaily decked the close-growing *Coprosma*, the trailing *Pimelia*, or the sharp-leaved *Leucopogon*, has succumbed to the stern rule of winter. Nor has this change of seasons affected the flora of the Alps alone. The insect world, in a thousand forms, which enlivened every mountain gully with the chirp and busy hum of life, now lies entranced in its mummy state, as inanimate as the torpid lizard that takes its winter's sleep sheltered beneath some well-pressed stone. Under the effects of this great change that cuts off such a supply of food, the Kea gradually descends the gullies, where a certain amount of shelter has encouraged the growth of the *Kowai* that yields its supply of hard bitter seeds, the beautiful *Pittosporum* with their small dark seeds packed in gluten, and the black-berried *Aristotelia*; these and numerous other shrubs or trees, such as the Pitch-pine and *Totara*, furnish some of the means of life to this parrot. It is during the continuance of this season that we have had the best opportunities of becoming somewhat familiar with it.

Within the last few years it has discovered the out-stations of some of the back-country settlers. Of course every station has that indispensable requisite, a meat-gallows; it has found out and fully appreciates the value of this institution, as occasionally affording an excellent supply of food; the gallows is generally visited by night, beef or mutton equally suffer from the voracity of the Kea, nor are the drying sheep-skins despised. These visits may be looked upon quite as social gatherings, for it is by no means a rare occurrence for a score of these noisy parrots to be perched on the roof of a hut at one time. It has been before observed that some species of the *Trichoglossinæ* affect a meat diet occasionally; the Kaka is fond of picking up shreds of fat; whilst at some out-stations in the interior, carcasses of sheep hanging in the meat-gallows are at times covered with busy groups of beautiful green parroquets, that move restlessly about within and without the carcasses, rending away morsels of fat. Here we have representatives of two genera of our honey-eating parrots showing a keen relish for grosser food than the delicate sweets that may be gleaned from expanded flowers.

A son of the writer obtained some fine specimens by means of a very simple snare, the noose made of a very slender strip of flax leaf attached to the end of a ricker or rod. He described the bird as exhibiting great boldness and confidence, clambering about the roof of the hut, allowing a very close approach: when caught they remained quite still, without any of the noisy fluttering which usually accompanies the capture of birds, even when managed with adroitness; they preserved this quiet demeanour till the noose had been removed. One of these birds was placed on the floor under an inverted American bucket, the places for the handle not permitting the rim of the bucket to touch the ground; the Kea quickly took advantage of this, wedged its long beak into the space, and, using its head as a lever, moved the bucket sufficiently to effect an escape from its prison.

On the other side of the river, just opposite the homestead where this was written, one station is greatly favoured by these visitors. During the winter season they become a perfect nuisance.

On one occasion the hut was shut up, as the shepherd was elsewhere required for a day or two. On his return he was surprised to hear something moving within the hut, and on entering found it proceeded from a Kea, which had gained access by the chimney: this socially disposed bird had evidently endeavoured to dispel the *ennui* attendant on solitude by exercising its powerful mandibles most industriously—blankets, bedding, and clothes, were grievously rent and torn, pannikins and plates scattered about, everything that could be broken was apparently broken very carefully, even the window-frames had been attacked with great diligence; in fact, the bird gave a new reading to that moral line of warning, "For Satan finds some mischief still for idle hands to do."

One more instance of this bird's mischief, or rather perhaps love of fun; on a back-country sheep-run, a mule packed with a full load of stores and sundries for one of the out-stations was peacefully pursuing its way, when on a sudden a Kea perched on the neck of the animal; this unexpected arrival was too much for the gravity of the mule; startled from its accustomed demure and patient demeanour, it plunged and kicked till it had freed itself both from the Kea and its well-packed burthen, the contents of its load being scattered in all directions.

Notwithstanding the high character which individuals of the species have earned for occasional indulgence in mischief, several have been kept as pets—not in wooden cages, by-the-bye, for a Kea has been seen by his gratified captor to eat its way out of such a place of confinement almost as quickly as it had been coaxed to enter into it. Two which had been tamed by a neighbouring friend were permitted to wander at large; they regularly returned to the house for their meals, and then rambled away again, scrambling and clambouring amongst the trees and out-buildings; any kind of food appeared to suit their accommodating appetite, but a piece of raw meat was evidently the *bonne bouche*. On the level ground its mode of locomotion is very peculiar; it is not so much a walk as a kind of hopping jump, which imparts a very odd appearance to its gait, but when its strong climbing foot is observed, this is not to be wondered at, for it will be seen how inferior is the strength and power of the two inside toes in proportion to that of the outer ones; the short tarsi also being unfitted for walking.

In addition to the superior size of the bird and the colour of its plumage, the beak presents a marked contrast to that of the Kaka; it is smoother, less curved, and much slighter, with a length of two inches from the gape to the point; the upper mandible, at the widest part—that is in a line with the nostrils—measures five and a half lines in width, with a height of seven lines.

In flight, the two species greatly differ, as they do in voice and in their breeding habits. The tree-loving Kaka occasionally makes its nesting-place and rears its young amongst rocks in wooded gullies. The Kea breeds in the deep crevices and fissures which cleave and seam the sheer facings of almost perpendicular cliffs that in places bound as with massive ramparts the higher mountain spurs. Sometimes, yet rarely, the agile musterer, clambering amongst these rocky fastnesses, has found the entrance of “the run” used by the breeding pair; has peered with curious glance on the worn track till the trace of its course has been lost in the dimness of the obscure recesses beyond the climber’s reach. In these retreats the home or nesting-place usually remains inviolate; its natural defences of intervening rocks defy the efforts of human hands, unless aided by the use of heavy iron implements that no mountaineer would be likely to employ. The eggs

as yet remain to be described : young birds have been taken from a locality on the Minaret run ; amongst other places, on the Mesopotamia station on the Upper Rangitata. A few years back a prospector returning to the pale of civilisation from the distant mountains he had explored, brought with him in his camp-kettle, or billy, a pair of nestlings ; on his long and solitary march these had shared his fare, and reached Christchurch in good and healthy condition. The mountaineer has employed his staff to get out the young ; the alpine stock being thrust close to the birds, the mischievous youngsters cling to it with beak and claws, and keeping a tight hold, are drawn out with the stock.

Although comparatively few people are acquainted with the bird, it is not on that account to be considered rare ; the reason it is so little known is the remoteness of its habitat from the centres of population. It certainly appears to be very local in its distribution ; a straggler now and then has been observed far from its usual haunts, for in one instance we have a note of its occurrence at the Hororata, in the Malvern Hills, close to the edge of the Canterbury Plains. Its beak can inflict a severe wound ; a friend of ours incautiously handling a pet had his hand bitten through by its powerful mandibles.

The month of March appears to be the moulting season, for some specimens obtained in the end of that month were observed to be clean moulted, whilst other birds, got some weeks earlier, had the new plumage only partially developed, such specimens presenting but a ragged appearance.

At the shearing muster of 1868, at Mr. Campbell's station at Wanaka, at Te Anau, and Wakatipu, and possibly on some other runs, it was noticed that many sheep appeared to be suffering from an hitherto unknown disease ; it took the form of a sore, or scar, on the back, immediately in front of the hips. In some cases the part affected had a hard dry scab, or merely a patch of wool stripped off ; others showed a severe wound, in some instances so deep that the entrails protruded,—every victim had been injured in precisely the same spot, fairly above the kidneys. It did not fail to strike the keen-eyed shepherds that the animals so maltreated were in the best condition, amongst which were found hoggets, fat wethers, dry ewes, and double-fleeced sheep. Many discussions ensued in the "warris" as to the cause of these scars and deadly wounds which thinned out some of the best

sheep of the mob, and left others in a more or less sorrowful plight. Many a pipe was smoked out whilst shrewd heads were meditating and speculating on what could have occasioned such an inexplicable and mysterious visitation. At last a musterer gave it as his opinion that the injury was inflicted on the sheep by a kind of parrot, rather a tame sort of bird that was to be met with on the tops of the ranges, and that the said bird was uncommonly like a Kaka. This suggestion was received with ridicule, and his sharp-witted audience overwhelmed the observant musterer with jokes and quaint expressions of unbelief. But the shepherds saw Keas visiting the meat-gallows, tweaking off mutton fat with their strong beaks; soon after one or more hands actually saw a parrot on a sheep, plucking and tearing wool and flesh on a precisely similar spot on the back, where so many had been found to be fatally wounded.

Now that the men were on a track, there was plenty of evidence soon forthcoming as to the mischievous and destructive propensities of these bold assailants; the examination of the animals mauled so injuriously, showed that in the majority of cases very little of the flesh had been devoured; it had been torn away apparently, not so much for food, but rather as an obstacle that prevented the bird's being able to reach the kidney fat. The flocks that suffered most from these marauders were almost invariably those which were depastured on the higher mountain ranges where the nature of the country was exceedingly rugged. In these regions their peculiar domain, about the snow-line, for they seldom quit the tops, the birds, although gregarious, do not move about in large flocks: if as many as fifty are seen together, it is of rare occurrence; they usually are scattered in small flights, as from a pair up to perhaps the number of a dozen individuals. It is no exaggeration to place the extent of their range as covering some millions of acres; it stretches northwards from the towering highlands that enclose the picturesque shores of Te Anau and Wakatipu, through the whole length of the Mackenzie Country, as far as the jagged peaks against whose sides rest the numerous glaciers from which spring the Rangitata, the Ashburton, and the Rakaia; its dominion appears to be yet extending, for, whilst this paper has been preparing for the press, I have heard of Keas having been obtained at Grassmere by the West Coast Road. Pressing northwards, it is found at

Lochinvar, at the head-waters of the Esk, and towards the sources of the Hurunui.

Sheep whilst being got out of snowdrifts are often mortally hurt by the attacks of Keas; especially are the birds prone to molest those carrying double fleeces, as though they knew how firm a foothold they could maintain with their grip. When one of these sheep, temporarily exhausted with its exertions in toiling through deep snow under the burthen of two years' growth of wool, breaks off from the mob and leaves the track, desperately floundering into deeper snow wreaths, a flock of parrots, ever watchful, as they hover round, soon perceive their opportunity for mischief: they alight close to the spot where the sheep, unconscious of approaching danger, stands gazing fixedly in a state of helpless stupidity; gradually hopping or moving towards the victim with some show of caution, one of the Keas at last settles on the rump of the sheep, which, terrified at the strange visitor that thus besets it, bounds away; the bird now rises only to alight again on the same place, clutching into the wool with its sharp claws it retains its hold more firmly and tenaciously. In vain the tortured animal in the direst agony seeks to rid itself of its cruel persecutor, that boldly keeps its vantage; after running and struggling some distance, its efforts to escape become feebler; it is at length so hard pressed that in a few minutes it yields passively to the tearing and searching beak of the Kea, that seems to probe into the very core of pain; the wretched sheep sinks down paralysed with the excruciating torture relentlessly inflicted by its persevering enemy.

The spoil obtained by the sheep-killer is the much-coveted kidney fat, which once plucked out and devoured, the remainder of the carcase possesses no further attraction; it is quickly abandoned, and the dealer of mischief hies him off in quest of a fresh victim. The majority of the sheep thus attacked die under the infliction, but many recover, though wofully disfigured; when flocks are got into yards, a certain proportion bear the scar that tells of the onslaught of the Kea; some of the wounds appear quite dried up, the bones bleached, and the sinews hard and dry. One would be almost inclined to think that the parrots were actuated more by a spirit of mischief than by the pressure of hunger, as usually so very little of the flesh is eaten, the bird restricting itself to the kidney fat, for which dainty only it exhibits an appetite.

To obtain this much prized delicacy, such a large hole is pierced that the loins are lacerated and torn, so that the bones are often exposed, and the sinews "look like fiddle-strings," as a shepherd expressed it. In the winter months these attacks are most frequent. Newly-shorn sheep are as a rule unmolested; this may arise from the shortness of the wool affording a less secure hold than a full fleece, or more probably because there is an ample supply of food easily obtainable during summer and early autumn; in fact, sheep are neither disfigured nor destroyed during warm weather. Various attempts have been made to lessen the numbers of the mountain parrots; advantage has been taken of their confidence and boldness to kill them with sticks and stones; many are snared off the meat-gallows. On some stations hands are sent out to shoot them; cries of a wounded one will cause many to assemble around it; sometimes a number are destroyed on these occasions, but it is found that they grow shy and wary where a gun is often employed, as they are soon 'cute enough to know when a man carries a gun.

On one station, the winter before last, two men were engaged for the destruction of Keas at a shilling per head; to make the best of the nocturnal habits of the birds, these men ranged the mountains at night,—a sufficiently hazardous undertaking,—lighting fires to attract their game; in the daytime they rested, and prepared the skins for sale. After six weeks spent in this laborious and dangerous occupation, they had accumulated something over one hundred specimens. Although the number seems small, the loss amongst the sheep that season was lighter than the average for several years before on that part of the run on which the men were engaged. In hunting Keas there is great uncertainty in meeting with flocks of them, sometimes three or even four days may elapse without one being seen. On the western side of the island they fly from the Mount Cook range to the bluffs by the sea-shore, passing over the intervening wide areas of forest at a great height.

Last winter numbers appeared on the ranges about the Upper Rangitata, where hundreds were shot during the winter months of June, July, and August; numbers were killed on Dog Range, Ashburton, by hands employed in packing; and if one might judge from the number of heads and quantity of feathers lying about the camp, the men were rather fond of Kea pie.

From many sources we gather that the annual loss from the Kea to the sheep farmer on some runs where the bird is most destructive varies from three to five per cent. of the flock; this, for obvious reasons, is very unlikely to be over-estimated, but we can give instances where exceptional losses have been very heavy indeed. On one station on the Matatapu the owner resolved to begin cross-breeding; with this view twenty Lincoln rams were purchased; within a month nineteen of the number were killed by parrots. On another run, during the month of April, 310 strong young wethers were got in off the back-country; as it was late in the season the owner resolved not to shear them, but to put them on a good low-lying spur; in September they were looked at, and they were found lying in dozens with holes in their backs, untouched in every other part; of the original number, 105 only remained alive. This gives an idea of the destruction that threatens double-fleeced sheep.

On one outlying portion of a lake-run the birds were so destructive that, although there were 30,000 acres of good grass land, the occupiers decided not to place stock upon it; the losses had been so great that it was found better to abandon the country. In the great snow-storm of the winter before last they were seen to eat the flesh of sheep; this is given as of rare occurrence, for, as said before, they seem to be inspired by mischief rather than urged by the pangs of hunger. It has been suggested that their numbers might be reduced by means of poisoned fat; those interested will doubtless be ready to make any experiment which holds out hope of saving their flocks from very considerable losses. At present the Kea shows a remarkable exception to the almost universal declension in numbers of most species of native birds.

The following descriptions are taken from two specimens obtained on the banks of the Havelock:—

Male.—Bill smooth, curved; upper mandible dark brown colour, lightest at the culmen, approaching to black near the base, the inside marked with slight longitudinal furrows; lower mandible yellowish on the sides, furrowed on the inside; cere, covering the base of the upper mandible at its widest part, measuring five lines; nostrils raised or swollen; upper part of the plumage dull green, with a silvery shade; shafts of feathers dark brown; feathers tipped, sometimes margined, with dark brown; forehead

brownish green; feathers which rest against the gape produced into hair-like points; under parts dull silvery green, with brownish wash; nape silvery green, with almost a collar of dark brown; quill-feathers, the third and fourth are the longest in the wing, dark brown, the basal part of the first four feathers blue on the outer web; inner web dark brown, toothed with pale yellow; the rest of the primaries of a brighter blue on the outer web; secondaries bluish green on the outer web, inner web brown, toothed irregularly with pale yellow; under wing-coverts yellow and bright scarlet, slightly tipped with brown; tail, shaft of feathers produced beyond the web, dull green shot with blue, with a broad mark or band of dark brown near the end, tip pale brown, inner webs toothed with yellow, under side of tail-feathers washed with yellow; lower part of back and upper tail-coverts green, shaded with dark orange-red, margined with brown; vent and under tail-coverts yellowish green. Bill, following the curve from gape to point, two inches; wings from flexure, twelve inches nine lines; tail, seven inches seven lines; tarsus, one inch seven lines; largest toe with nail, two inches three lines; total length from point of bill to extremity of tail, twenty-one inches.

Female.—The plumage is rather duller than that of the male, the under nape of neck closely marked with dusky brown. Bill, two inches; wings from flexure, twelve inches four lines; tail, seven inches; tarsus, one inch five lines; largest toe and nail, two inches three lines; total length, twenty inches nine lines.

[A living example of this Parrot, which has rarely been brought to Europe, may now be seen in the Zoological Gardens, Regent's Park.—ED.]

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 205.)

Genus *ACHÆUS*, Leach.

This genus is at present represented in Britain by one species only. It somewhat resembles the genus *Stenorhynchus*, but the rostrum is stunted, the carapace more tuberculated and larger in proportion to the length of the legs; the eyes are placed on long

peduncles, and are non-retractile; the abdomen is six-jointed in both sexes, a fact which Bell was only able to record by reference to Milne-Edwards.

Achæus Cranchii, Leach.

As before stated, this species is the only one of the genus known as British, and its occurrence is rare even in favoured localities. The carapace is roughly triangular, contracted behind the eyes and suddenly enlarging into a prominence, and again into a rounded elevation at its lower angles; the legs are very hairy, the last two pairs having curved claws, as in the genus *Stenorhynchus*. The antennæ are also hairy, and the carapace moderately so. The rostrum is stunted, and is formed, as Milne-Edwards remarks, of "two little triangular teeth." The males appear to have the tuberculated structure of the carapace more decided than have the females. This species may be distinguished from young specimens of the genus *Stenorhynchus* by a prominence on the eye-stalk, by the shorter legs, and by the stunted rostrum.

Bell records two instances only of the capture of this interesting species. One specimen is stated to have been placed in the British Museum, and the other in Dublin. We have, up to the time of writing these notes, obtained sixteen specimens, twelve of which were dredged near the Channel Islands, whilst four, all males, were found amongst an immense number of various species of Crustacea which strewed the Sussex coast after the disastrous storm of January 18th, 1881. Two specimens are recorded from Galway; and in the Ann. & Mag. of Nat. Hist., vol. xvii., 1866, Mr. Spence Bate writes that he finds this species not uncommonly off the coast of Devon, and that five specimens taken from six fathoms near the Knap buoy off the western end of Plymouth breakwater appear to be distinct varieties; his attention was drawn to them by their habit, which he says is not usual—namely, that of covering themselves with sea-weed. In the typical form the spines are straight, which give a hairy appearance. In this variety the spines are curved, and lie close to the surface, which makes it look smooth. Closely inspected, the spines are hooked. Mr. Bate failed, however, to find any other difference to indicate that it is more than a variety. In Mr. Carrington's collection are two female specimens of *A. Cranchii*, well covered, even the legs also, with little bits of weed. These were obtained

in the month of December, and from the fact of their being without ova at that time we may conclude that this species is probably with ova at the same period as those of allied genera.

The localities known to us for this species are the Channel Islands, Plymouth, the Sussex coast, and South Devon; specimens are recorded from Galway, but we have little doubt, if carefully looked for, it will be found elsewhere. Prof. Milne-Edwards when he wrote his work, gave Falmouth Bay as the only known locality.

Genus *INACHUS*, Fabr.

We now come to a most interesting and characteristic little group, consisting of three species at present known to Britain, so similar in their general features as to form a distinct and decided genus, and yet so varied in their specific features as to enable the most casual observer to define and recognise each individual species at a glance. This genus, like the former two, is included in the popular designation of "Spiders," and the general form of the carapace supports the theory that it constitutes a link in the development to the triangular form of the genus *Stenorhynchus* from the rounded or oval form of less highly developed genera and species.

The general form of the carapace in this genus is that of a rounded triangle, spinous and developed into rounded prominences, which will be specifically described. The antennæ are very short and the rostrum is stunted and cleft. The legs are long, but, like the peculiarity already mentioned with regard to the carapace, they appear to be in process of changing from the shorter and more easily protected appendages of the genera *Pisa* and *Hyas* to the long and attenuated legs of the genus *Stenorhynchus*; they are also stout to the second joint, when they rapidly taper off to the terminal joint.

The second pair of legs are the longest in both sexes. The abdominal segments are six-jointed in both sexes. The eyes are situated on short peduncles and are retractile, being the first genus we arrive at with this further peculiarity.

Inachus dorsettensis, Penn.

Bell says that this species was first described by Pennant from specimens in the Portland cabinet, and captured at Weymouth, giving it the name *P. dorsettensis*. M. Milne-Edwards has described it under the name of *I. scorpio*.

In the carapace of this species the lower sides are developed into rounded bosses armed with a stout spine, and between them there is a smaller prominence with another spine. The anterior portion is armed with four small tubercles placed in a row. This is a characteristic mark of the species. The abdominal segments have a ridge dividing them centrally. Those of the female are very broad, affording great protection to the ova; those of the male widening at the third and fourth joints, and slightly at the last. The rostrum is stunted and notched centrally, widening more than that of the two following species; this is another specific distinction. The eyes are retractile, or rather can be turned back into their orbit-cavities, and are protected by spines on the anterior and posterior margins of the orbits. The antennæ are very short, the movable portion extremely so. The legs are elongated, and the anterior pair in the male developed into stout pincers or forceps, which are but small and insignificant in the female.

This species is pretty generally distributed, and appears to affect both deep and moderately shallow water. M. Milne-Edwards, under the name of *scorpio*, speaks of it as inhabiting the shores of the "channel" and the "ocean." We have obtained it in considerable numbers from various parts of the English Channel, principally off the Sussex and Dorset coasts; some females that we obtained from Weymouth in December were with immature ova. It has also been recorded from St. Andrews (occasionally), Shetland (very rare), Galway (common), Belfast, Dublin Bay (thrown up after storms), Hebrides, Plymouth, and Hastings, while Fabricius found it in the Norwegian seas. Couch states that it is taken commonly in crab-pots, Cornwall; and Professor Wyville Thompson ('Depths of the Sea,' p. 181) speaks of *Inachus dorsettensis* as occurring in deep water, as also did Capt. Beechey, R.N., who is stated to have brought up a specimen alive from a depth of 140 fathoms in the Mull of Galloway. It thus appears to be a fairly well-distributed species, and, from our own experience, we should advise collectors to examine catches of *Stenorhynchus*, as this species sometimes occurs with them.

The ova of this species are very similar to, though somewhat larger than, that of the genus *Stenorhynchus*; they are of an orange colour deepening to a rich red as development of the yolk proceeds.

We have not yet had an opportunity of seeing the zoeæ form, but imagine it to resemble that of the genus *Stenorhynchus*. Our excuse for referring so frequently to genera already described is, that we find points of definition and determination are much better understood by drawing comparisons to what is already recognised and familiar; besides the interest which attaches to the development of forms from one type to another under new or varied conditions of existence.

Inachus dorchynchus, Leach.

This species so much resembles the last that it will be more easily understood if we simply describe the specific distinctions. The carapace is less developed into rounded bosses, and the row of four small tubercles which characterises *I. dorsettensis* is represented in this species on the anterior portion of the carapace by two spines, one situated beneath each spine of the orbit.

The rostrum is nothing more than the anterior angle of the carapace cleft to a slight depth, varying in some cases to a mere notch. The hands are smoother than those of the former species, and the first two joints of the other legs less robust.

Bell seems to think that its resemblance to the former species may cause it to be mistaken for that, and thus account for its apparent rarer occurrence. We are, however, inclined to think that it is undoubtedly far less common than *I. dorsettensis*. We have also observed a most decided difference in general appearance; *I. dorchynchus* being smaller, less robust, and of a pinker colour than the species previously described. This species is also generally cleaner and brighter, and less affected by artificial covering of sponges, &c. The female was unknown to M. Milne-Edwards.

Inachus dorchynchus has been recorded as taken at Shetland, Belfast, Dublin Bay (common), Galway, St. Andrews (occasionally), Cornwall, Hastings, Durham, and Berwick. We have obtained it from Jersey, from crab-pots, in November, when some of the females were with mature ova, which resembles that of *I. dorsettensis*, but we have had little opportunity for examining it as yet.

Inachus leptochirus, Leach.

This most interesting species differs from the two preceding in one or two important details. The carapace is extremely like

that of *I. dorhynchus*, although Bell figures it as proportionately smaller and more simple, which we have not found to be the case in the large number of specimens which we have examined. The legs are very long, much longer than those of either of the other two species of the genus; the anterior pair are particularly striking in this respect, and mark the distinctiveness of the species at a glance. Its most remarkable and characteristic feature is the existence, in the male, of a polished calcareous tubercle on the sternum, between the bases of the leg joints: this tubercle is peculiar to the genus, and is only represented in one other known species from the Mediterranean, viz., *I. thoracicus*, in which it forms a plate. "Sternum du mâle, garni en avant de deux plaques calcaires ovalaires réunies par une pièce médiane."*

Bell speaks of this species as being "extremely rare," and gives solitary instances of its capture, stating that it was discovered by the late Mr. Cranch on the west coast of Devon and Cornwall: it has since been recorded from Shetland (deep water), Dublin, Belfast, Clifden, and the Hebrides, and there is no doubt that it is less common than *Inachus dorsettensis*, and may be looked upon with *I. dorhynchus* as "a good thing." We have fortunately obtained a fine series of this interesting crustacean, many of which were taken from the deep part of the English Channel, off the Sussex and Dorset coasts. Another locality from which we obtained it was off Guernsey in a crab-pot; and this leads to a remarkable instance of extreme locality, which may possibly account for the supposed great rarity of this species. A fisherman who worked regularly a number of crab-pots stated that this crab always occurred in quantities in one particular pot, and never by any chance in any others in the locality, not even in the next pots on either side. Upon repeated visits we found this to be literally true, and this one little spot is the only place there upon which we can rely to obtain this species. Another of this same set of pots was also similarly resorted to by a starfish, *Ophiocoma granulata*, this instance helping out the other in proving that this extreme limit to localities does most certainly exist as much on the sea bottoms from some favourable cause or other, probably the presence of congenial food, as it does on land where the presence of certain conditions favours

* Milne-Edwards, 'Hist. Nat. des Crust.,' vol. i., p. 289.

the existence of individual species, and confines them to limited areas.

Inachus leptochirus is with ova in November, those we observed at that time being in an immature condition. The ova resemble those of the two preceding species, being spherical and of a rich orange colour, becoming darker as the zoeæ forms; the zoeæ itself we have not yet seen. The swimmerets of the females of this genus are admirably adapted to protect the ova, and are, moreover, beautiful objects when examined by the microscope; they resemble very much the plumose antennæ of the males of many of the *Nocturni* amongst the Lepidoptera; their position and duty in the economy of the animal is a most interesting one, and perhaps no other genus of British Crustacea than *Inachus* shows this remarkable development to such advantage.

(To be continued.)

OCCASIONAL NOTES.

WILD CAT BREEDING IN CONFINEMENT.—In the review of Prof. Mivart's work on 'The Cat' (p. 269), I am said to have "succeeded in getting the wild and domestic cat to breed together in confinement"; but this I cannot claim to have done, as I never even attempted to cross-breed from any of my Wild Cats. It was Mr. Pusey, of Pusey House, Berks (erroneously mentioned as in Oxfordshire in my letter in 'The Zoologist' for 1873, p. 3575), who bred several hybrids between the two animals, a handsome pair of which he presented to the Zoological Society, as I mentioned (*loc. cit.*). I can, however, claim to have "ascertained the curious fact (p. 270) that the period of gestation in the Wild Cat is sixty-eight days, or twelve days longer than the ordinary gestation of a tame cat"—a pair of Wild Cats in my possession having bred four consecutive years (1875—1878), the first two occasions being recorded in 'The Zoologist' for 1876. The litters consisted of three and two alternately.—ALFRED HENEAGE COCKS (Great Marlow, Bucks).

SUPPOSED OCCURRENCE OF THE CRANE IN CO. DUBLIN: CORRECTION OF ERROR.—There is a strange alteration in my notice of the Crane at Howth (p. 259) which appears to have arisen from your having expanded my meaning beyond my intention. By "appendage to the tail" I intended to refer to the bushy, loose tail-coverts which collect over the rump in a large tuft or bunch, and are in themselves sufficient to enable one to identify the

bird. The *legs* were not noticed by my friend, and your having laid stress on them and not on the tail-feathers seems to me to have weakened the identification. There is also an unfortunate repetition at the end of the notice, by which the two specimens in the Dublin Museum are multiplied into four. Will you kindly insert this necessary correction?—HENRY CHICHESTER HART (71, St. Stephen's Green, Dublin).

[We regret that, in endeavouring to elucidate our correspondent's meaning, we have placed a wrong construction on his words. We took it for granted that by "appendage to the tail" he could only mean an *apparent* appendage caused by the bird carrying its legs straight out beyond the tail after the fashion of Cranes, Herons, Storks, and other long-legged birds. The well-known "plumes" to which he now says he intended to refer are in no sense of the word "an appendage to the tail"; nor are they, as he supposes, "tail-coverts." They are simply the elongated tertials with unconnected webs, reaching beyond the extremities of the primaries. We trust under the circumstances our correspondent will pardon the unintentional perversion of his meaning. With regard to the "repetition" at the end of the notice to which our correspondent refers, we can only say that we printed his own words.—ED.]

SUPPOSED OCCURRENCE OF THE VIRGINIAN HORNED OWL IN IRELAND.—Having recently examined five specimens of the Virginian Horned Owl in different museums, I am convinced that Dr. Burkitt's bird (described by me, p. 262) is of that species, and is not an Eagle Owl. Besides its smaller size and general dissimilarity of appearance, it has not the long distinct black spots characteristic of the Eagle Owl, while its more intricate markings and the rounded spots of white on many of its feathers may be seen on specimens of the *Bubo Virginianus*, a species which, however, seems to vary much in its markings. If I have correctly determined this specimen, it is, I believe, the only instance on record of the occurrence of the Virginian Horned Owl in the British Islands, if not in Europe; and Dr. Burkitt (who obtained the only specimen of the Gold-vented Thrush and of the Hawk Owl in these islands, as well as a Great Auk) will have preserved to us more than one unique specimen of a straggler to our shores. With the Great Belted Kingfisher and the Yellow-billed American Cuckoo it has reached this Ultima Thule from beyond the Atlantic. Dr. Burkitt's notice of it, made at the time, states that it was shot at Belle Lake (Co. Waterford) on January 27th, 1851.—RICHARD J. USSHER (Cappagh, Cappoquin).

LESSER SNOW GOOSE IN IRELAND.—In 'The Zoologist' for 1878 (pp. 419, 453) I gave some account of the capture in the Co. Mayo of the Lesser Snow Goose, *Anser albatus*, Cassin. It may be recollected that out of a flock of seven which visited some marshy ground at Termoncarra, in the Barony

of Erris, in October, 1877, one was shot, and another subsequently trapped. The latter, a gander, was after a temporary confinement placed with some domesticated geese. I have just been informed that it is still alive, and after slaying a rival in fair fight, has paired with one of the common geese, and assisted to rear a little family of goslings. As this is, I believe, the first time that so remarkable a cross has occurred, it seems well worthy of being placed on record. As the goslings are still too young to judge of what their adult appearance may be, a description must, for the present, be reserved.—J. E. HARTING.

RARE BIRDS IN SOMERSETSHIRE.—Mr. H. Mathias, of Haverfordwest, has a small collection of Somersetshire birds which he purchased some few years ago at the sale of Mr. Spalding, of Chilton Poldon, near Bridgewater, who was a collector of local antiquities and rare birds. Among these last were a Black-winged Stilt, a Bee-eater, and a Little Crake, all obtained near Bridgewater, and also a Pratincole, shot on the Mendips, “near Weston-super-Mare.” As the number of British-killed Pratincoles is very small, it is worth while to record this one, of which no information, so far as I know, exists in any local catalogue.—MURRAY A. MATHEW (Stonehall, Wolf’s Castle, R.S.O., Pembrokeshire.)

SUBCUTANEOUS WORMS IN PEREGRINE FALCON.—At page 515 of ‘The Zoologist’ for 1880, Mr. A. Bevington reports that, in a Peregrine which he examined, he found several white worms under the skin at the back of the abdomen. I had an opportunity last winter of dissecting a female bird of this species in dark plumage, which appeared to me to be a very old bird, the muscles being exceedingly tough; and in this specimen I found numerous long thread-like bodies closely imbedded between the peritoneum and subserous tissue both at the back of the liver and stomach. So firmly were they invested that I had regularly to dissect them out, and I fear have broken them in places. I send them for your inspection, together with a piece of tissue still containing one or part of one.—HERBERT LANGTON (Brighton and Hove Dispensary, Brighton).

[We forwarded the phial and its contents to Dr. Spencer Cobbold, whose special knowledge on the subject of Entozoa renders his opinion in a case of this kind most valuable, and he has been good enough to send us the following interesting report.—ED.]

“The parasites submitted to my examination are examples of *Filaria attenuata*. In the month of April, 1855, I removed a worm of this species from the back of the abdomen of a Peregrine. This worm measured as much as ten and a half inches in length (Linn. Trans., vol. xxii., p. 164). *Filiaria* are remarkably abundant in the muscles and soft parts, not only of the rapacious, but also of the passerine and some

other birds. Probably not a few of the various alleged species are identical. Be that as it may, the worms found by Messrs. Langton, Bevington, and myself, are evidently referable to the commonest known form. Falcons, Hawks, and Owls are equally liable to harbour *Filaria attenuata*, which likewise infests the Crows, Nutcrackers, Starlings, and many other passerine species. To be more precise, this Entozoon has been obtained from six different species of *Corvus*, and it has likewise been found in the genera *Garrulus*, *Pica*, *Pyrrhocorax*, *Nucifraga*, *Sturnus*, and *Cassicus*. To determine the source of this and other *Filariæ* infesting birds remains a problem for future investigations to solve. We possess, however, some general knowledge of the habits of these worms, and from the recent observations of Sonsino, Manson, and Lewis respecting the Micro-*Filariæ* of *Corvus splendens* there can be little doubt that all the *Filariæ* are migratory in habits, requiring a change of hosts. In *Pica caudata* the embryos of this species were found in the blood. The subject is very complicated; but in this connection permit me to call especial attention to the remarkable finds of Dr. Manson in China. Hæmatozoa, and sometimes the parent *Filariæ*, were found by Manson in *Pica media*, *Gracupica nigricollis*, *Corvus torquatus*, and *Goura coronata*. A curious pathological appearance is presented by the heart of the Chinese Magpie stuffed with specimens of *Filaria picæ-mediæ* (Mans. & Cobb.), but it is not more remarkable than the similar appearances that are to be found in many other vertebrates. Further particulars on this subject will be found in the 'Journal of the Quekett Microscopical Club' for August, 1880."—T. SPENCER COBBOLD.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

May 5, 1881.—ARTHUR GROTE, Vice-President, in the chair.

Prof. Eichler, Director of the Botanic Gardens, Berlin, and author of several important botanical contributions, was elected a Foreign Member.

Mr. C. Stewart exhibited and described an ovum of *Helix hæmastoma*, remarkable for its great size as compared with that of the animal. The generative organs are also peculiar.

Mr. George Busk gave an abstract of a "Descriptive Catalogue of the Species of *Cellepora* collected on the 'Challenger' Expedition," in which some thirty-one species of this Polyzoan genus are referred to. Of these the North-Atlantic yields three from depths ranging from 51 to 450 fathoms. The South Atlantic furnishes five species from 500 to 600 fathoms. Of seven species from the immediate neighbourhood of Kerguelen Land (or so-called South Indian Region) three were got from depths ranging from 20 to 150

fathoms. From the Australian Region eleven species, with one exception (*C. solida*), obtained from two to four fathoms. Only two species obtain from the North Pacific Region, respectively 18 to 310 fathoms. From the South Pacific 304 species have been derived, 45 to 150 fathoms being the extremes of depths, save in the case of *C. magellensis* from 1325 fathoms. Mr. Busk arranges the 'Challenger' *Cellepora* into five sections distinguished by the general habit of the Zoarium, viz.:—(1) Encrusting or foliaceous expanded; (2) Hollow or more or less cylindrical; (3) Branched, solid; (4) Of massive irregular growth; (5) Fusiform. He describes among others some thirty new species, and observes that as a whole the genus *Cellepora* of this Expedition appear to belong to comparatively shallow water.

Anniversary Meeting, May 24, 1881.—Prof. ALLMAN, LL.D., F.R.S., President, in the chair.

There was a numerous attendance of the Fellows. The Treasurer (Mr. F. Currey) read his annual report stating that financially the Society continued prosperous. Afterwards the Secretary (Mr. B. Daydon Jackson) read his report. Since the last anniversary eleven Fellows of the Society had died and four had withdrawn; against this thirty-seven new Fellows had been elected, besides one Foreign Member and one Associate. After fifty years' service Mr. Kippist had resigned his position as Librarian to the Society, and the Council, in acknowledgment thereof, had granted him a retiring pension. Prof. Allman then delivered his anniversary address, his subject being "Recent Advances in our Knowledge of the Development of the *Ctenophora*." The Secretary afterwards read obituary notices of the several Fellows, making special mention of Mr. E. R. Alston, Mr. John Gould, Mr. Gerrard Krefft, Dr. Lauder Lindsay, and Mr. A. Pryor.

The Scrutineers reported that Mr. A. W. Bennett, Mr. F. Darwin, Prof. E. R. Lankester, Sir J. Lubbock, and Mr. J. G. Romanes had been elected into the Council, in the room of E. R. Alston (deceased), Dr. T. Boycott, Prof. M. Foster, Dr. J. G. Jeffreys, and Prof. Mivart, who retired; and for officers, Sir J. Lubbock as President, F. Currey as Treasurer, and B. D. Jackson and G. J. Romanes as Secretaries.

June 2, 1881.—Sir J. LUBBOCK, Bart., F.R.S., President, in the chair. Mr. R. Romanes, of Rangoon, was elected a Fellow.

Dr. G. Hoggan exhibited and made remarks on preparations of the lymphatics of vascular walls.

Mr. Elwes exhibited samples of quinine made by a new process, without expensive chemical apparatus, by Mr. Gammie, superintendent Government Cinchona plantations of Sikim.

Sir J. Lubbock read a paper "On the Habits of Ants."

Mr. S. O. Ridley read a paper "On the Genus *Plocamia* of Schmidt, and some other Echinonematous Sponges." With reference to the genus mentioned, for which he accepted Prof. Duncan's name of *Dirrhopalum*, he enumerated three species already described, but assigned to other genera, which must be added to it; the distribution is thus extended from the tropical Atlantic to the British, Portuguese, and Ceylon seas. He described a New Zealand species which proves to be new to science, and appears to decide a point which has been disputed—viz., the existence of ceratinous material in the skeleton. Geological facts were brought forward showing the existence of the genus in the Eocene upper chalk and green-sand formations. A new genus of the same order was described, based on a species of Lamarck, and two other species; it is closely allied to *Dictyocylindrus*; its distribution extends from Arabia to Australia.

Prof. P. M. Duncan made a communication on two new species of Sponge from the Atlantic sea-bed.

The ninth part of "The Mollusca of the 'Challenger'—Family of *Pleurotomidæ*," by the Rev. R. Boog Watson, was read in abstract by the Secretary.

June 16, 1881.—Sir J. LUBBOCK, Bart., F.R.S., President, in the chair.

Mr. Alexander Somerville, Capt. J. T. Wright, and Mr. John Forrest, the Australian explorer, were elected Fellows of the Society.

The Rev. W. Higgins exhibited a specimen of *Holothuria* which had been obtained between Patagonia and the Falkland Islands. This he had identified as *Psolus squamatus*, and he observed that it had been figured by Otho F. Müller, in his 'Zoologia Danica,' but its southern locality now adds an interesting proof of the wide distribution of the species.

A paper was read entitled "A Revision of the *Idoteidæ*," a family of Sessile-eyed Crustaceans, by Mr. E. J. Miers. In this contribution the author, after some introductory remarks on the history and classification of the group, enumerates critically forty-seven species, besides several varieties, distributed into four genera. The *Idoteidæ* are found in all parts of the globe, but more abundantly in the temperate and colder seas than in the tropics, and usually at moderate depths on sandy, muddy, or rocky bottoms. Their nearest affinities are with the *Chatiliidæ* and *Arcturidæ*, and whether the latter finally may be associated with the *Idoteidæ* future workers will determine.

A communication was read "On the Nostrils of the Cormorant," by Professor Ewart. Certain structural peculiarities were described which apparently accounted for, or seemed possibly connected with, the bird's habit of flying with its mouth open.

The President then announced the close of the Session, and that the next evening meeting would be held on November 3rd, 1881.—J. MURIE.

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THIRD SERIES.

VOL. V.]

AUGUST, 1881.

[No. 56.]

NOTES ON THE FOOD OF BIRDS.

COLLECTED BY FRANK NORGATE.

HOBBY.—In addition to small birds, feeds on the dung-beetle, *Geotrupes stercorarius* (Yarrell), and dragonflies (Harting).

RED-FOOTED FALCON.—Large Coleoptera (Yarrell) and dragonflies (Harting).

MERLIN.—Chiefly Larks, Pipits, and Linnets; occasionally Snipe and Dunlin; also large moths, principally of the Eggar species (Booth, Zool. 1878, p. 133).

KESTREL.—Chiefly field-mice and grasshoppers; occasionally small birds, especially Starlings (Harting). Coleopterous insects and their larvæ, earthworms, cockchaffers (Yarrell), meadow brown(?) butterfly (F. Norgate).

SPARROWHAWK.—Birds, mice, and lizards.

KITE.—Twenty-two moles have been found in a Kite's nest. It preys also on frogs and snakes (Yarrell), and on young game of all kinds (Booth, Zool. 1879, p. 58).

ROUGH-LEGGED BUZZARD.—Remains of six rats in one stomach ('Field,' Nov. 20th, 1880). Mice, frogs, &c. (Yarrell).

HONEY BUZZARD.—Wasps and their larvæ, Coleoptera and their larvæ, whitish coloured hairy larvæ, pupæ of a butterfly and of the six-spot Burnet moth, frogs and grey snails, larvæ of bees, rats, and lizards (Yarrell).

MARSH HARRIER.—Small mammals and birds, especially the young of waterfowl, reptiles and fish (Yarrell).

HEN HARRIER.—Small birds of all kinds. Twenty lizards found in one specimen (Yarrell).

MONTAGU'S HARRIER.—Five lizards found in one specimen (Yarrell).

SCOPS EARED OWL.—Mr. W. Spence says, "It feeds wholly upon beetles, grasshoppers, and other insects" (Yarrell). Earwigs and larvæ of various kinds (Stevenson).

SHORT-EARED OWL.—January, mice; February, harvest-mice; March, mice; April, crickets and field-mice; May, shrews and cockchaffers; June, beetles; July, field-mice and birds; August, field-mice and shrews; September, field-mice and beetles (Florent Prevost); October, field-mice and beetles; November, mice and field-mice; December, mice, spiders and woodlice. Rats and bats (Yarrell).

LONG-EARED OWL.—January, February and March, mice; April, cockchaffers; May, cockchaffers, rats and squirrels; June, mealworms, beetles and shrews; July, mice, ground- and other beetles; August, mice and shrews; September, October and November, mice (Florent Prevost). Rats, moles, mice, and small birds (Yarrell).

BARN OWL.—January and February, mice; March, April, May and June, field-mice; July and August, mice; September and October, field-mice and shrews; November, mice and black rats; December, mice (Florent Prevost). Sparrows and Greenfinches (Harting). Rats and mice; perch (Yarrell). One nest of Barn Owls was supplied with twenty fresh rats, all killed in one night. Other nests were supplied, some with rats only, some with mice only. One nest contained many bushels of the remains of rats, mice, voles and shrews, and a few wireworms. On examining more than thirty nests I found the remains of only one bird, a Blackbird, which appeared to have been used as food, besides the rats and mice and shrews. (F. Norgate.)

TAWNY OWL.—According to Dr. Altum, fifty-two pellets of Tawny Owl contained three *Crossopus fodiens*, one *Crocidura araneus*, ten *Sorex vulgaris*, eleven *Talpa europæa*, one *Mus decumanus*, two *M. musculus*, six *M. sylvaticus*, two *Arvicola amphibius*, one *A. glareolus*, one *A. agrestis*, thirty-three *A. arvalis*, one *Sciurus vulgaris*, one *Emberiza citrinella*, eleven other small birds; fourteen *Carabus granulatus*, four *Dytiscus*

marginalis, four *Scarabæus stercorarius*, one *Silpha rugosa*, and two *Harpalus* sp.? (Dresser). Moles, rats, mice, frogs, birds, insects, bullhead, loach, and other fish, &c. (Yarrell).

SNOWY OWL.—Feeds almost exclusively on lemmings, near Discovery Bay. Twenty-seven lemmings and remains of a hare were arranged round one nest of eggs and young; such supplies were also seen surrounding a nest of eggs alone (H. Chichester Hart, Zool. 1880, pp. 122, 123).

HAWK OWL.—Mice, insects and birds (Yarrell).

TENGMALM'S OWL.—Mice and large insects (Yarrell).

GREAT GREY SHRIKE.—Large insects, especially beetles, mice, shrews, frogs, lizards, and small birds (Yarrell). Wasps and *Vanessa Urticæ* (Stevenson).

RED-BACKED SHRIKE.—May chaffer and other insects, mice and small birds (Yarrell). Impaled on acacia and whitethorn I have found one *Carabus violaceus*, one *Geotrupes*, one fragment of *Necrophorus*, two *Bombus virginialis*, five *B. leucorum*, five *B. Latreillellus*, six *B. lapidarius*: of these four species of humblebees, eighteen specimens were queens. Also one frog, one Wren, one Ray's Wagtail, one young Linnet, and two Sand Martins (F. Norgate).

SPOTTED FLYCATCHER.—Believed to feed almost exclusively on winged insects (Yarrell). Bluebottle-flies (Bartlett).

PIED FLYCATCHER.—Winged insects (Yarrell.)

DIPPER.—Beetles, larvæ of *Ephemera* and *Phryganæ* (Yarrell). Soft-shelled Mollusca, such as *Limnæa*, *Ancylus*. Various water-beetles and their larvæ, water-spiders (*Argyroneta*), dragonflies (*Agrion*) and their pupæ, and the larvæ of caddis-flies (Harting). The water-boatman (*Notonecta*), larvæ of *Ephemera* (most destructive to salmon-spawn), *Phryganea*, *Hydrophilus* (most of these insects feed on fish-spawn), besides such fresh-water molluscs as *Lymnea* and *Ancylus*, already named (Stevenson).

SONG THRUSH.—Snails and worms, insects of various species, and fruit.

FIELDFARE and REDWING.—Larvæ, worms, slugs, beetles, and berries of various kinds.

BLACKBIRD.—Larvæ, worms, snails, and fruit. In January the Blackbird feeds on spiders, pupæ, and seeds; February, spiders, pupæ, and seeds; March, grubs, worms, and buds of

trees ; April, insects, grubs, and worms ; May, cockchaffers and worms ; June, worms, grubs, and fruits ; July, all sorts of insects, worms, and fruit ; August and September, all sorts of insects, worms, and fruit ; October, worms, pupæ and grubs of butterflies ; November and December, pupæ, corn, and seeds (Florent Prevost).

RING OUZEL.—Larvæ, worms, snails, and fruits (Yarrell).

GOLDEN ORIOLE.—Larvæ, insects, fruit (Yarrell). In January the Golden Oriole feeds on pupæ ; February, pupæ and worms ; March, grubs and beetles : April, ground-beetles and weevils ; May, beetles, moths, grubs, and butterflies ; June, grubs, grasshoppers, bees, and cherries ; July, beetles and cherries ; August, weevils, pupæ, worms, and fruit ; September, beetles, grubs, worms, and fruit ; October, grubs, green herbs, pupæ, berries, and barley ; November, worms and ants (Florent Prevost).

ALPINE ACCENTOR.—Insects and seeds (Yarrell).

HEDGE SPARROW.—Insects (chiefly spiders and small beetles), worms, and seeds.

REDBREAST.—Earth-worms, insects, fruit. In January the Robin feeds on insects, pupæ, and worms ; February, insects, worms, and wood-lice ; March, pupæ and worms ; April, moths, eggs of insects, and cockchaffers ; May, grubs and beetles ; June, flies, moths, spiders, and worms ; July, moths, butterflies, and woodlice ; August and September, moths, butterflies, woodlice, and worms ; October, eggs of insects and aquatic insects ; November, worms and pupæ ; December, pupæ, larvæ, and eggs of moths (Florent Prevost).

BLUETHROAT.—Insects, earthworms, berries (Yarrell).

REDSTART.—Worms, beetles and their grubs, flies, spiders, ants and their eggs, fruit (Yarrell). Redstarts feed their young with little green grubs from gooseberry trees twenty-three times per hour, usually with more than one grub at a time (Bishop Stanley).

BLACK REDSTART.—Insects, worms, fruit (Yarrell).

STONECHAT.—Small-winged insects, beetles and worms.

WHINCHAT.—Insects, worms, small testaceous Mollusca, small white meadow slugs, and berries.

WHEATEAR.—Small beetles and spiders (Stevenson). Insects and worms (Yarrell).

GRASSHOPPER WARBLER.—Insects and small snails.

SEDGE WARBLER.—Aquatic insects, worms, and small fresh-water Mollusca.

SAVI'S WARBLER.—Insects and worms (Yarrell).

REED WARBLER.—Aquatic insects, *Libellulæ*, small worms, and aquatic Mollusca.

GREAT REED WARBLER.—March, insects; April, aquatic grubs; May, grubs of house-fly and dragonfly; June, worms, grubs, flies, and May-flies; July, beetles and dragonflies; August, worms, eggs of insects, and beetles; September, aquatic insects (Florent Prevost).

NIGHTINGALE.—Flies, moths, spiders, and earwigs. Young Nightingales are fed principally on small green caterpillars (Yarrell). In February the Nightingale feeds on grubs and worms; March, grubs, worms, pupæ, and ground-beetles; April, flies, meal-worms, beetles, red worms; May, butterflies, weevils, cockchaffers, and grubs; June, spiders and wood-boring beetles; July, worms, grubs, eggs of locusts, grasshoppers, moths, flies; August, glow-worms, weevils, grubs; September, locusts, worms, beetles, dragonflies; October, grubs, beetles, and worms; November, flies and worms (Florent Prevost).

BLACKCAP and GARDEN WARBLER.—Insects and fruit (Yarrell).

WHITETHROAT.—Supposed to feed on gooseberry-sawfly larvæ (Rev. T. H. Marsh). Insects, particularly white caterpillars, fruit.

LESSER WHITETHROAT.—Insects and fruit.

WOOD WARBLER.—Insects and their larvæ.

WILLOW WARBLER.—Flies, Aphides, and other insects.

CHIFFCHAFF.—Gnats, flies, Aphides, moths, and small larvæ.

DARTFORD WARBLER.—Small insects (Yarrell). Feeds its young on the bodies of a large yellow moth (Booth, Zool. 1877, p. 59).

TITMICE.—In the spring destroy *Cheimatobia brumata*, females and larvæ (Stevenson). They feed their young about sixteen times per hour (Bishop Stanley).

GREAT TIT.—In January, beetles and eggs of insects; February, grubs; March, water-snails, beetles, and grubs; April, bees, cockchaffers, and beetles; May, bees, cockchaffers, and beetles; June and July, cockchaffers, flies, and other insects; August, insects and fruits; September, seeds, grasshoppers, and crickets; October, berries; November, seeds (Florent Prevost).

BLUE TIT.—Aphides, other insects, and seeds (Yarrell). Aphides from gooseberry-bushes (F. Norgate). Feeds young

on very small green caterpillars. Rears from nine to fourteen young in each brood, and feeds them about three hundred times a day (F. Norgate). If eggs or nest be repeatedly destroyed, Blue Tits will lay four or five times in succession in one summer (about forty eggs altogether). Blue Tits and Great Tits may be encouraged and increased to almost any extent by hanging up suitable nesting-boxes (F. Norgate).

CRESTED TIT.—Insects and small seeds of evergreens (Yarrell).

COLE TIT.—Insects (bees ?), thistle-seeds (Yarrell).

LONG-TAILED TIT.—Insects (Yarrell).

BEARDED TIT.—Insects, seeds, and testaceous Mollusca, such as *Succinea amphibia* and *Pupa muscorum* (Yarrell). Mr. Dykes found in the crop of one Bearded Tit twenty *Succinea amphibia* and four *Pupa muscorum* (Stevenson).

WAXWING.—Berries of rowan, hawthorn, ivy, yew, and insects taken on the wing (Yarrell).

PIED WAGTAIL.—Insects, especially aquatic species and their larvæ, and minnows (Yarrell).

GREY WAGTAIL.—Aquatic insects and small Mollusca, such as *Cyclas cornea* and *Ancylus fluviatilis*.

GREY-HEADED WAGTAIL.—Aquatic insects, small green caterpillars, flies, and moths.

RAY'S WAGTAIL.—Small insects (Yarrell).

TREE PIPIT and MEADOW PIPIT.—Insects and worms (Yarrell).

ROCK PIPIT.—Aquatic insects.

RICHARD'S PIPIT.—Several species of flies and gnats. A ladybird and ichneumon were found in the stomach of one killed at Yarmouth in April (Stevenson).

SHORE LARK.—Insects, grass, seeds, &c.

SKY LARK.—Grain, grass, seeds, insects, and worms. In January, seeds of wild plants; February, seeds and corn; March, various insects, worms, seeds, and corn; April, insects, beetles, and corn; May, beetles; June, flies and various insects; July, grasshoppers, corn, and worms; August, crickets and grasshoppers; September, insects, seeds of weeds, and corn; October, seeds, barley, and worms; November, seeds, corn, and berries (Florent Prevost).

WOOD LARK.—Grain, grass, seeds, insects, and worms (Yarrell).

SHORT-TOED LARK.—Insects and seeds (Yarrell).

LAPLAND BUNTING.—Seeds of *Arbutus alpina* (Yarrell).

SNOW BUNTING.—Grass seeds, buds of *Saxifraga oppositifolia*, and Mollusca. Feeds its young on insects (Yarrell). Caterpillars, vegetables, and seeds (H. C. Hart).

BUNTING.—Grain (Yarrell).

REED BUNTING.—Insects, seeds, and grain.

YELLOW BUNTING.—Insects, seeds, and grain.

CIRL BUNTING.—Berries of *Solanum dulcamara*. Feeds its young on insects.

ORTOLAN.—Grain, seeds, and insects.

CHAFFINCH.—Larvæ of gooseberry-sawfly (Rev. T. H. Marsh). Insects, seeds, and tender vegetables (Yarrell). In March, insects, &c.; April, moths, flies, and various insects; May, cockchaffers, grubs, and eggs of insects; June, cockchaffers, grubs and eggs of insects, and wild fruits; July, cockchaffers, grubs and eggs of insects, grubs of beetles, and wild fruits; August, moths and butterflies; September, eggs of insects, worms, and seeds; October, wood-boring beetles, insects, and seeds; November, December, January, and February, seeds (Florent Prevost).

BRANBLING.—Seeds of *Polygonum aviculare* (Yarrell).

TREE SPARROW.—Insects, soft vegetables, and seeds (Yarrell).

HOUSE SPARROW.—Seeds, soft fruits, insects, particularly larvæ; also young vegetables. Feeds its young thirty-six times per hour (Bishop Stanley). Feeds young almost exclusively on insects injurious to man; in the country it eats seeds, grain, and grubs of butterflies; in towns it lives on all kinds of *débris*, but prefers cockchaffers and other insects to every kind of food (Florent Prevost). Destroys in immense quantities small *Melolonthæ*, called "Chovies" (Stevenson).

GREENFINCH. — Grain, seeds, insects, and soft vegetables (Yarrell). In January, worms, seeds, berries, wild fruits; February and March, the same; April, the same, and insects; May, June, July, and August, the same; September, October, November, and December, worms, seeds, berries, and wild fruits (Florent Prevost).

GOLDFINCH.—Caterpillars and other insects; seeds of thistle, burdock, dandelion, chickweed, groundsel, plantain, and alder (Yarrell).

SISKIN.—Ragweed, beechmast, and other seeds.

LINNET.—Seeds of flax, thistle, and dandelion; and particularly of cruciform plants. In May, insects, seeds, and berries; June, insects, seeds, and berries; July, insects, seeds, and berries; August, insects, seeds, and berries; September, insects, seeds, and berries; October, November, December, January, February, March, and April, seeds, berries, &c. (Florent Prevost).

TWITE.—Heads of *Centaurea nigra* (Yarrell).

BULLFINCH.—One in confinement ate 238 seeds of *Cnicus lanceolatus* (the spear-plume thistle) in about twenty minutes, though plentifully supplied with hemp-seed (Stevenson). *Cheimatobia brumata*, female, and larvæ in the spring (Stevenson); as also the blossom-buds of plum, apple, medlar, cherry, and gooseberry; and in winter, hips, the fruit of the dog-rose, berries, and seeds (Yarrell).

CROSSBILL.—Seeds of fir, apple, and mountain ash (Yarrell). Vast flocks of Crossbills at Hungerford in July, 1810, destroying Aphides on the young shoots of cherry-trees, observed by Mr. Hall, who says, "The Crossbill places its bill to the side of the leaf, and clears them out (though covered with insects) in a few seconds" (Zool., 1880, p. 321).

STARLING.—Insects, worms, snails, berries, grain. Often perches on the backs of sheep, apparently searching for insects. In January, the food consists of worms, grubs of cockchaffers, grubs in dung; February, grubs, snails, and slugs; March, snails and grubs of cockchaffers; April, grubs of cockchaffers and snails; May, grubs of cockchaffers, snails, and grasshoppers; June, flies and their larvæ; July, grubs and fresh-water molluscs; August, flies, glow-worms, and beetles; September, green locusts, worms, and grubs of carrion-beetles; October, worms and beetles; November, snails, slugs, and grubs. In summer, also fruit. In winter, also hips, haws, and buds of trees (Florent Prevost).

RED-WINGED STARLING.—Coleoptera (Stevenson & Lubbock).

ROSE-COLOURED PASTOR.—Insects appear to form a principal part of their food; but they are also partial to fruit, such as cherries; and grain, such as *Andropogon sorghum* and *Panicum spicatum*. Destructive to locusts. Perch on sheep and cattle for insects (Yarrell).

CHOUGH.—Five Choughs kept on a lawn were incessantly employed in destroying grubs which were in the roots of the grass and were turning part of the lawn brown (Bishop Stanley).

The Chough also feeds on grasshoppers, fern-chaffers, great chaffers, and other insects, berries, and occasionally grain. It also follows the plough for upturned grubs (Yarrell).

RAVEN, CROW, and HOODED CROW.—Small Mammalia, birds, eggs, reptiles, grain, insects, molluscs, and carrion.

ROOK.—Grubs of common cockchaffer, locusts, wireworms of several sorts, larvæ of the crane-fly, caterpillars of *Agrotis segetum* (Yarrell). Also grain and walnuts, and in dry summers they destroy many eggs (F. Norgate). In January, Rooks eat field-mice and grubs of cockchaffers; February, red-worms, field-mice, and grubs of cockchaffers; March, larvæ and pupæ; April, slugs, worms, and pupæ; May, beetles, larvæ, prawns, and wireworms; June, cockchaffers, eggs of birds, and wood-boring beetles; July, young birds, beetles, &c.; August, birds, field-mice, weevils, grasshoppers, crickets, &c.; September, worms and grubs; October, grasshoppers, ground-beetles, and young animals; November, young rabbits, grubs, and insects; December, animal and decaying substances (Florent Prevost).

JACKDAW.—Insects, seeds, grain, eggs, carrion, Mollusca, and Crustacea. They also perch on the backs of sheep for insects or wool, perhaps both (Yarrell).

MAGPIE.—Young animals, young birds, eggs, fish, carrion, insects, fruit, and grain (Yarrell). In January, grubs of cockchaffers, beetles, and seeds; February, grubs of cockchaffers, beetles, seeds, and berries; May, cockchaffers, glow-worms, and fruit; June, cockchaffers, glow-worms, weevils, and fruit; July, beetles and field-mice; August, birds' eggs and weevils; September, beetles, worms, barley, and grasshoppers; October, grasshoppers, carrion-beetles, and green locusts; November, grasshoppers and kernels of fruit; December, grubs of cockchaffers, berries, and young rabbits (Florent Prevost).

JAY.—Insects, worms, peas, cherries (Yarrell). January, grubs of cockchaffers, acorns, and berries; February, pupæ, grain, seed; March, grubs, insects, corn; April, grubs, beetles, and snails; May, cockchaffers and locusts; June, eggs of birds, cockchaffers, and beetles; July, young birds, flies, and beetles; August, young birds, flies, beetles, acorns, grubs, and dragonflies; September, young birds, flies, acorns, beetles, grubs, dragonflies, and fruits; October, beetles, slugs, snails, and grain; November,

beetles, slugs, snails, and grain ; December, slugs, beetles, snails, grain, haws, and hips (Florent Prevost).

NUTCRACKER.—Coleoptera, *Geotrupes stercorarius* (Stevenson). Insects, seeds of pines, pinaster, and stone pine ; beechmast and nuts, eggs, and young birds (Yarrell).

GREAT SPOTTED WOODPECKER.—Various insects, ants and their eggs, spiders, and seeds (Yarrell). Blue and green flies (F. Norgate). *Cossus ligniperda* (T. E. Gunn).

GREEN WOODPECKER.—January, ants ; February, worms and grubs of ants ; March, slugs, beetles, and grubs of ants ; April, ants and worms ; May, red ants and grubs of wasps ; June, bees and ants ; July, red ants ; August, red ants and worms ; September, ants and worms ; October, grubs of ants ; November, grubs of ants and bees ; December, ants (Florent Prevost). According to Naumann, the Green Woodpecker feeds at all seasons, chiefly on ants and their pupæ, *Formica rubra*, *F. fusca*, *F. nigra*, but seldom on *F. herculeana*. It also finds in the ant-hills the larvæ and pupæ of *Cetonia aurata*, which, with many other ground-beetles, it eats with avidity. It sometimes attacks wasps' nests for the sake of the larvæ (Dresser).

LESSER SPOTTED WOODPECKER.—Small insects (Yarrell).

WRYNECK.—Insects and their larvæ, large quantities of ants, and their eggs (Yarrell).

CREEPER.—Small insects of all sorts (Yarrell).

HOOPOE.—January, worms, grubs, and snails ; February, worms, grubs, and snails ; March, worms, grubs, and snails ; April, worms, grubs, and snails ; May, flies, dragon-flies, and grubs of May-fly ; June, water- and land-snails, flies, &c. ; July, water- and land-snails, flies, and wood-lice ; August, water and land-snails, flies, and wood-lice ; September, water and land-snails, flies, and wood-lice ; October, snails, flies, and spiders ; November, snails, flies, and spiders ; December, snails, flies, spiders, and worms (Florent Prevost).

NUTHATCH.—Larvæ, insects, nuts, berries, hard seeds, and beechmast (Yarrell).

CUCKOO.—According to Count Casimir Wodzicki, the Cuckoo is most useful in destroying *Bombyx Pini*, eating its eggs and larvæ. In 1847 a pine-forest in Darsin, Pomerania, was threatened with destruction by these larvæ, when it was suddenly saved by a large number of Cuckoos which were on passage, but remained two

weeks to enjoy the abundance of food; and in a very short time they so cleared the forest that the pest did not appear the next year. According to Mr. Zimmermann, on the island of Elbe, at Leitmeritz, the larvæ of *Liparis chrysorrhœa* appeared in such quantities as almost to prevent the otherwise much visited promenade from being used, when four pairs of Cuckoos began to clear away the larvæ, and remained quite peaceably together (Dresser). Mr. J. H. Gurney, jun., told me of the larva of *Zeuzera Æsculi* being found in the stomach of a Cuckoo. Some which I dissected were full of large hairy larvæ, probably those of *Spilosoma menthrasti* and *S. lubricipeda*. The gizzards of all Cuckoos, both old and young, dissected by me were entirely lined with such a thick layer of the hairs of such larvæ that when the gizzards were turned inside out they resembled the skins of mice. The hairs appeared to be firmly rooted, and all pointing in regular order as if they had been all brushed in one direction by the action of the gizzard. I have known many Cuckoos to frequent gooseberry-bushes in a garden at Aylmerton for several days, and believe they were destroying larvæ (F. Norgate). Old Cuckoos seem most partial to hairy larvæ. Young Cuckoos eat flies, beetles, larvæ, grasshoppers, small snails, tender shoots of grass, young wheat, or vetches (Yarrell). Larvæ of *Pieris brassicæ*, larvæ infesting gooseberry-bushes, and especially hairy larvæ (Stevenson). From July 18th to 22nd forty Cuckoos were seen, chiefly among gooseberry-bushes, in a garden in the county of Down. Almost all permitted a very near approach, but yet not near enough to be caught by hand (Bishop Stanley). A young Cuckoo killed on August 20th contained about twenty full-grown larvæ of *Vanessa Io* (Bishop Stanley). Young Cuckoos seem to have enormous appetites, and to be fed by several different species of birds, besides their own foster-parents (F. Norgate).

ROLLER.—Insects, worms, slugs, and berries (Yarrell).

BEE-EATER.—Takes its food on the wing. Chiefly winged insects, Hymenoptera, bees, Cicadas (Yarrell). One Bee-eater contained the remains of five large hymenopterous insects—humble bees? (Stevenson).

KINGFISHER.—Water-beetles, leeches, minnows, sticklebacks (Yarrell). Water-beetles and *Notonecta* (Stevenson).

SWALLOW.—Insects (Yarrell). Food consists chiefly of *Staphylinus brachypterus* (Bishop Stanley). For some lengthy

remarks on the food of the *Hirundinidæ*, see Harting, 'Our Summer Migrants,' pp. 171—174.

HOUSE MARTIN.—Mosquitoes (Yarrell).

SAND MARTIN.—Gnats, small *Libellulæ*, and other insects (Yarrell).

SWIFT.—Insects, chiefly *Staphylinus brachypterus*, and spiders (Bishop Stanley).

NEEDLE-TAILED SWIFT.—See 'Zoologist,' 1880, pp. 83, 84.

NIGHTJAR.—Moths, beetles, and fern-chaffers (Yarrell).

ROCK DOVE.—Grain, seeds, and molluscs, such as *Helix virgata*, *Helix ericitorum*, and *Bulimus acutus* (Yarrell).

RING DOVE.—Turnip-tops, grain, and seedling potatoes; acorns, beechmast, seeds of wild mustard, dock, and rag-weed. It also devours quantities of *Potentilla anserina*, breaking it off in pieces about an inch in length.

STOCK DOVE.—Much the same food as the last named.

PHEASANT.—Wireworms (Stevenson). Insects, ants' eggs, roots of *Ranunculus bulbosus* and *R. ficaria*, acorns, sloes, haws, blackberries, seeds, buckwheat, green leaves, beans, peas, grain (Yarrell). In Hockering Wood the gamekeeper told me the young Pheasants were very fond of eating the insects which are contained in lumps of white froth adhering to the grasses and other herbage—the larvæ of Homoptera (F. Norgate).

CAPercaillie.—The young feed principally at first on ants, worms, insects, &c. The old birds feed on the needles and shoots of *Pinus sylvestris*, juniper berries, cranberries, blueberries, and other northern berries (Yarrell).

BLACK GROUSE.—The natural food of the young bird at first is apparently insects only. It is very partial to the larvæ of Homoptera, and to the seeds of the "sprit" or rush. For a long note on the food of both Black and Red Grouse, see Harting, 'The Field,' Feb. 27th, 1875. When reared by hand, the Black Grouse thrives on common house-flies, ants' eggs, and well-scoured maggots.

PARTRIDGE.—Insects, ants' eggs, green leaves, and grain (Yarrell).

RED-LEGGED PARTRIDGE.—Insects, seeds, grain (Yarrell).

VIRGINIAN COLIN.—Insects, seeds, berries, and grain (Yarrell). In Norfolk seeds of furze (Harting). In America it feeds on

Hessian-flies, ants, beetles, flies, gnats, moths, grubs, wireworms, pupæ, larvæ, potato-bugs (*i. e.*, Colorado beetle), striped vine-bugs, chinch-bugs, cut-worms (hundreds of chinch-bugs found in one bird), locusts, and grasshoppers (Mr. Archer, and the State Entomologist for Missouri). For further interesting particulars, see 'The Field,' Dec. 13th, 1879.

QUAIL.—Insects, green leaves, seeds, and grain (Yarrell). In Ohio the Government stopped Quail-shooting for several years, on account of their great value to farmers as destroyers of grubs and wireworms. See leading article on Game and Game Laws in America ('The Field,' May 1st, 1880, p. 527).

GREAT BUSTARD. — Beetles, mole-crickets, grasshoppers, worms, snails, mice, &c. (Stevenson). Also green corn, grasses, trefoil and other vegetables, and probably reptiles (Yarrell).

NORFOLK PLOVER or THICK-KNEE.—Coleoptera, snails, ear-wigs, worms, slugs, and frogs (Stevenson). Insects, worms, slugs, Coleoptera of the genus *Carabus* (Yarrell). Beetles and worms (Lubbock).

LITTLE BUSTARD.—Insects, herbs, grain, lungwort, dandelion, grass, and leaves of white turnip (Yarrell).

GOLDEN PLOVER.—Insects, slugs, and worms (Yarrell).

DOTTEREL. — Insects and their larvæ, worms, and slugs. During the breeding season, small Coleoptera (Yarrell).

RINGED PLOVER, KENTISH PLOVER, and LITTLE RINGED PLOVER.—Insects, worms, and small Crustacea, such as shrimps and sandhoppers (Yarrell). The Kentish Plover is believed to feed chiefly on a very active species of spider which is abundant on the beach (H. A. Dombrain, Zool. 1880, p. 138). In the stomach of a Little Ringed Plover shot at Kingsbury Reservoir, Middlesex, Mr. Harting found several small beetles and a single caddis-worm. In the Common Ringed Plover, besides the remains of small beetles and worms, he has also noticed a mass of semi-digested vegetable matter, and invariably some small particles of coarse sand or gravel.

(To be continued.)

ON THE SPRING MIGRATION OF WADERS ALONG
THE EAST COAST IN 1881.

BY JOHN CORDEAUX.

HAVING during the past spring spent several hours daily on the coast of North-East Lincolnshire and Holderness, at the time the shore-birds were passing northwards, I have been able to take the following notes, which, without further remark, I now give in the order of their occurrence.

With the exception of some rather large flocks of Dunlin, none of our common shore-birds appeared before May 11th, when I saw Curlew, Whimbrel, and Godwit on the Humber foreshore. A pair of the latter feeding near the creek were male and female, the former in full summer plumage, with the under parts very dark red; the female, considerably the larger of the two, had the head and foreneck dashed with rufous, but with this exception, compared with the male, was very light coloured, a greyish yellow predominating. Near the creek end were a pair of Wild Ducks and a Sheldrake. On the 13th Whimbrel were in full force, both on the muds and in the coast marshes. On the 16th there was a strong gale from N.W. to N.: on this day I saw the first Grey Plover, two pairs, the males in full plumage, females less advanced, and the upper parts marbled with yellowish ochre and ash-grey, showing much lighter than the brown-black and white of their partners. I may here add that in every case I make a point of examining the birds through a powerful telescope. With the Grey Plover were some Dunlin in summer dress, and a Ringed Dotterel, the first seen this spring. The Grey Plover were feeding on small red worms, which they extracted, wading slowly, tarsal-joint deep, in the ooze. Hooded Crows were seen near Spurn on the 20th, and on the previous day a party of seven in the adjoining parish to this—an unusually late stay of these marauders. On the 21st, S.E. to S., hot sun and cold wind, nothing but Ringed Dotterel and black-bellied Dunlins on the flats.

During the second week in May flocks of Dotterel (*Eudromias morinellus*) were seen in our south-east marshes, but I was not fortunate in coming across them. A "trip" of about twenty was seen near Spurn about the middle of the month, and near Dimlington another "trip" of about thirty close to the coast. The

Common Sandpiper was very plentiful along the coast-line during the third week in May, and large parties of them frequented for some days the ponds and pools nearest the shore: all had left on the 20th. At Spurn, on the 25th, there were numerous waders, excepting the Dunlin, the Turnstone perhaps exceeding any other; these were, in some cases, in pairs, the male and female readily distinguishable, and also in small flocks, containing birds very much in the same plumage as the young of the year in the autumn, with others more advanced. It was very interesting to watch them foraging for food, tossing to and fro with the greatest rapidity the sea-tangle and tide-wreck. In some cases where the object was too large, the bird, first lifting it up with its bill, would then charge with its breast, and, regularly putting "shoulder to the wheel," roll all over together. The little black-bellied Dunlin feeding in the tidal pools were equally active in the pursuit of food; I frequently noticed them probing sideways all round a stone, so that no small crustacean or annelid concealed beneath could have escaped their nerve-guided touch. The only Sanderlings seen were two or three running, as Sanderling only can run, over the sand at the tide-edge, and following the recoil so far that the return wave came within an ace of carrying them away, avoided only by a quick upward spring and short flight. These Sanderlings, although this was the end of May, had no signs of their summer plumage, nor had one or two Knots feeding in company with some Turnstone. Three Whimbrels and two Turnstones in the same pool made a very pretty picture, the latter probing amongst the pebbles for shrimps and sandhoppers, the others on one stiff straight leg, the second tucked up to the belly, and their scythe-like bills hid away under the brown scapulars. Pleasant, too, it was to watch five Lesser Terns, a pair of Dunlins, and a Turnstone, all washing in the same pool and afterwards preening and drying themselves on the sands. Under shelter of the sandhills, with the glass poised in position, it seemed only necessary to stretch out a hand to touch them.

Hot as was the sun-glare on the heated sands, yet a cool and rather brisk sea-breeze swept the dunes, otherwise it would have been no desirable task to walk the seventeen miles I did that day, not, however, without frequent halts, lying on my back amongst waving sea-grass and looking deep into a summer sky crossed with driftings of frailest cirri; then there was the sea ever booming

on the pebbles below, and a water horizon round half the circle, unbroken by a sail, but flecked by many a curling crest tossed up by summer breeze. Swallows and Martins flew so low that as I lay I could hear the "swish" and feel the winnow of wings on my face, for the insects were down, and might be taken from the tips of the wind-bowed bents, hovering, as a Kestrel takes a mouse. Sometimes a flock of Dunlin dashed across, just clearing the crest of the sandhills; one flock, specially noted, for they were directly over my nose, had individually the black abdominal patch; yet another flock, which shortly followed, were birds which, excepting the streaky brown necks and upper breasts, had the under parts entirely white. Once four Black Terns, adult birds, flew past; they were following the coast-line towards the north, and subsequently I was told other small parties had been seen moving northwards by the same routes. Common Terns were numerous, and about twenty pairs of the Lesser Tern near the old nesting-quarters; I only succeeded in finding one egg, and that was partly covered with the drift of sand. In some rough cover of coarse grass and sallow-thorn a Short-eared Owl sat so close that I had well nigh trod upon him; off he dashed with a great flutter, beating to windward in an erratic see-saw fashion, the fawn-coloured patches on his wings shining like burnished copper. No doubt, like the Hooded Crows, a very late migrant, delayed from some cause or other—perhaps the uncongenial season—beyond the average date of departure.

How persistently during the whole day did those strange birds, the Cuckoos, hunt the sandhills, which, by the way, like our Humber embankments, are a very favourite beat of theirs; the smaller, the male bird, is quite as assiduous in hunting up the Pipits' nests as is his partner of the time; from long watching I conclude that he, too, hunts for nests, and possibly guides the female to them. These sandhills swarm with Pipits; one nest was cleverly concealed under a bunch of grass, the other end of which was weighed down by a drift of sand, and under this self-formed arch was the cosy grass-lined nest and five brown-grey eggs. The Ringed Plover, several pairs of which nest in this locality, kept up a perpetual plaintive whistle as they hurried to and fro, and the creaking cries of the Terns, distressed at the invasion of their dominions, might be heard long after the cause of their trouble had passed on his way. Beautiful little wanderer

over the tossing sea-wave! as we watch thy flight and mark thy perfect form, as if carved from the purest ivory, we are thankful that one of the most humane Acts ever passed by any Government, Whig or Tory, protects thy slight and sylph-like form from the pitiless and ever-destroying Philistine! Long mayst thou return to gladden our eyes in the pleasant spring time, and find a summer home on our shores!

A pair or two of Sheldrakes breed not far from this part of the coast, fortunately on protected ground; and I was told of two pairs of Pintails which had remained late on April in a private pond.

In the storm-beaten hedges on the cliffs, which, having small chance of growing upwards, expend all their energy in spreading landwards, were numerous small birds, the most frequent of which were the Common Bunting and Sedge Warbler. I also, amongst others, heard the Lesser Whitethroat—far less numerous than the common species, yet regularly occurring as a nester, and also passing through the district in some numbers, both in the spring and autumn. Subsequently, in Buckinghamshire, where it appears to be very common, I became thoroughly familiar with this little warbler. It haunts much the tops of high elms, and on sultry days its pleasing but somewhat monotonous song may be heard from early dawn till late in the day. I never heard it in the beech-woods, but everywhere else in tall and isolated clumps of trees and garden shrubberies.

On May 27th the Grey Plover mustered in some numbers on the Humber foreshore, with black-bellied Dunlin and a flock of the pretty small race of Ringed Plover, the *Charadrius intermedius* of Ménétriés. On June 1st, an intensely hot day, with the thermometer 95° in the sun, there were seven Grey Plover and three Turnstones together near our sea-creek; of the former, one was a perfect old male in full plumage, five others were less advanced, and the last was in sober grey, with the under parts white, and showing no trace of any change to summer plumage; the Turnstones were in an advanced but not perfect plumage. This was the last of them, but on the 16th of June, near the same place, was a Whimbrel all alone on the steaming flat, and, as far as glass could search the foreshores of our muddy river, nothing else save a score or so of the Brown-headed Gull.

ORNITHOLOGICAL NOTES FROM THE NEIGHBOURHOOD
OF CROMER.

BY J. H. GURNEY, JUN., F.Z.S.

IN my last communications on Cromer Ornithology I remarked that none of the Rough-legged Buzzards which occurred so numerous during the winter were adult birds, but some time after writing I saw a splendid adult "Rough-leg" at Mr. Dack's, the birdstuffer at Holt, which had been shot at Thornage as late as the first week in March.

March 18th seems a late date for fifteen Tufted Ducks to be on Ranworth Broad, as they have never been ascertained to breed in the east of the county; yet such was the case, and they appeared from their brown colour to be all females. It was late also for an adult pair of Goldeneyes and a flock of Wigeon, though not for a fine drake Shoveller. In addition to these ducks there were swimming about no less than twelve Great Crested Grebes in different states of plumage; and mooring my boat for a ramble on the marsh I saw a Peregrine Tiercel and a Marsh Harrier, the latter no longer the *genius loci*, as our old naturalists once termed him. I saw another on May 3rd at Barton. On March 29th there were again a great number of ducks of different kinds at Ranworth, but too shy for my accurate identification; and the flock of Great Crested Grebes appeared to have wholly attained the breeding garb. On April 22nd there was only one Grebe to be seen on the Broad; but three nests were in process of building, and would probably have contained eggs if it had not been for the east wind, which, according to the broad-man, had upset the nests when they were nearly ready. On the 26th, after four days' fine weather, Mr. R. B. Sharpe, who was on a visit to Norfolk in connection with the Fisheries Exhibition, found two eggs in one of these nests. I believe there is no time like the spring for observing these Grebes; for in the summer they conceal themselves with such cunning, that it is almost impossible to see them, although I observed five on one occasion on Ranworth Broad in May, and five on another on Hoveton Broad in July.

On April 23rd I accompanied my friend Mr. Norgate in a raid on some Carrion Crows' nests. The line of country between

Aylsham and Dereham is one of the fen districts in Norfolk where the Carrion Crow still breeds, and ere long Foxley Wood (to which, under Mr. Norgate's guidance, we directed our footsteps, and which is their great stronghold) is to be preserved, and the days of these plunderers of Pheasants' eggs will be numbered in that locality. Mr. Norgate showed me six nests in Foxley Wood, and seven or eight in tall grey poplars in meadows at Holbecks. We did not get up to all of these nests, but took three clutches of three eggs each. I was surprised to see how very cup-shaped the nests were, and all thickly lined with sheep's wool, and occasionally horse's felt and hare's fur, the nest itself being generally made of oak twigs and branchlets in Foxley Wood, where there is nothing but oaks; and of poplar, alder, and ash in the meadows, with a little maple and whitethorn. Some years ago Mr. Norgate found a path in Foxley Wood strewn with Pheasants' egg-shells, exactly as if boys had been running a paper chase and scattering shells instead of paper. These eggs, he believed, had been all sucked by Crows.

The Magpie is almost as much to blame, and I am sorry to say we had to sacrifice one of a fine pair at Northrepps which had been with us all the winter. Notwithstanding this the survivor paired again and brought off young ones, and on June 26th I saw six at one time in our "wall cover"—an unprecedented occurrence. On May 11th, there were many Turnstones at Cley, near Cromer; in one flock twenty-seven, some of which were in perfect plumage, others not so good; plenty of Whimbrel, true to their name of "May-bird" and mostly in pairs, and a pair of Shelducks; but no red Godwits, though this is about the date when they pass up the coast of Norfolk on their spring passage.

Nearly all our spring migrants arrived about the usual time. None were particularly early, but this year for the first time I did not remark the departure of the Hooded Crows in March. A few Kestrels and a good many Ring Doves appeared at Cromer, and the latter did some harm to the newly-sown wheat. No sooner is it sprinkled on the fields than they find it out, and by far the most damage is done in the first day or two. Of all omnivorous birds commend me to the Wood Pigeon. The food of this bird in the early part of March consists of beechmast, acorns, leaves of leguminous plants, ivy-berries, and peas. I have arranged them somewhat in order of abundance as I have found them in a

good many which I have shot and opened; but beechmast and acorns are the favourite diet. In April they attack the young wheat before it has begun to sprout. Their voracity is only equalled by the capacity of their crops. A Wood Pigeon's crop will contain from twenty to thirty acorns, or 100 beechmast or 500 ivy-berries, and then not be full. When satisfied they retire to some thick silver-firs to sleep, but the slightest rustling of a footstep, or the snapping of a branch, is enough to frighten them. They find both acorns and beechmast palatable enough long after they have begun to germinate, and I consider them much better for the table on such diet than when feeding on turnip-tops. With frost and snow they always leave Cromer. This bird is generally accredited with yellow eyes, but I have seen them both slate-coloured and white, the latter in the young bird. The birdstuffer at Holt has a Wood Pigeon with a crest three-quarters of an inch high. It was shot by the son of a game-keeper near here, and has this abnormal growth on the back of its head. It may possibly be the result of an old shot-wound.

OCCASIONAL NOTES.

ON THE FORMER EXISTENCE OF THE BEAR AND WOLF IN CORNWALL.—I venture to add to your very interesting abstract of one of the "Davis Lectures," published in the last number of 'The Zoologist,' a few suggestions as to the past Natural History of Cornwall. So far as I know, nothing has been discovered which makes certain the existence at any time of any sort of Bear (Badger of course excepted) in Cornwall; but in the Cornish language the word "Ors" is rendered "Bear," and in one of the oldest, if not the very oldest, existing records of the old Cornish tongue occurs the entry "Ursus = Ors = Bear" (see Norris's Vocabulary, and Borlase's 'Antiquities of Cornwall'). As a general rule, it is held that if the old Cornish language produces a word evidently based upon a Latin derivative (*pons* = a bridge, for instance) it represents something introduced, or at least renamed, by the Romano-Britons; and these are people who, however hazy the account of them may be, are within the limits of historical time, and consequently the fact that the Roman "Ursus" appears in Old Cornish as "Ors," meaning a Bear (Borlase says it means a he-bear), points to the conclusion that the Bear was existent in Cornwall long after the commencement of the Christian era. Our moorlands must have been then so vast in proportion to the size of our county

(and may be, then, our forests also) that the Bear frequenting them may have been an unknown animal to the people of extreme West Cornwall, who alone ever spoke the pure Cornish tongue until an invading (may be friendly) force brought them the news of the existence of the animal, and named it. I do not suppose that this theory of mine would, if supported by proof, bring the existence of the Bear in Cornwall much later than the third century of the Christian era; but it is supported by facts enough to show that an animal named with the equivalent of the modern word "Bear" was known in Cornwall within historic times. There is a local tradition prevalent in this district that very early in the eighteenth century an old dog-wolf infested a rocky hill called Trencom, about six miles from Penzance; that, after many hunts, he was one day chased thence to a thicket close by the railway on the north side east of Marazion Station, and now known as Darlington Burrows, and there killed; and that this was the last Wolf killed in Cornwall. I do not put much reliance on the date of the tradition, but I suppose that the existence of it shows that Wolves were extant in Cornwall to within a recent historical period. It is unsafe to rely on the word "Wolf" occurring in names of places as indicating the former existence of the animal in places so named. The Wolf Rock on which the lighthouse is built, nine miles out at sea off the Land's End, can have no connection whatever with the animal "Wolf," but has a direct and distinct connection with the name of some hardy Norseman, "Olaff," who was once lost there, or who perhaps may have discovered it.—THOMAS CORNISH (Penzance).

ON THE YOUNG OF THE PINE MARTEN.—I received two young Pine Martens from Cumberland on June 13th, and think the following points are worth recording. They were said to have been caught by a shepherd "in a brossen-rock" (of which word I should be glad to receive an explanation). "The shepherd's dog found them, and he got them out of the crevice of the rock with his stick." There were only these two in the litter. With the exception of Bell (1st and 2nd edit.), who says, "The number of young ones at a birth is stated to be usually but two or three," the minimum, according to the few authors I have consulted who give numbers, is variously stated as three or four, while the maximum ranges between four and eight! In 'The Zoologist' for 1879 Mr. C. A. Parker, writing of Cumberland, says (p. 171) the young "are born about the end of April or beginning of May, and are two or three (never more) in number"; and again (p. 264), "on April 12th a female Marten was killed . . . and two young ones found, still blind, one being considerably larger than the other." On July 2nd I measured one of my cubs (there is no perceptible difference between the size of the two), with the following result, which is about as accurate as it is practicable to get with a wriggling, fidgetting live animal:—

Length of head, 4 in.; of neck and body, $11\frac{1}{2}$ in.; of tail (including hair-point), 8 in. They had, I think, increased nearly two inches in total length in the nineteen days between their arrival and the date of taking the measurement, of which increase fully an inch belongs to the tail. Those of the authors I have looked up who assign a date for the time of birth of the young, give April or May; but I should think from their size that these cubs must have been born three months, which brings the time to the beginning of April or the end of March, though of course it is impossible to speak positively without considerable experience with the young of the species, and the rate of growth would also depend largely on the feed. This date, however, agrees with that in the instance recorded by Mr. Parker, as the young would no doubt be blind for at least four weeks. On July 5th I found that both cubs had got their permanent incisors in the upper jaw; one has cut both upper permanent canines; the other cub has one upper canine just showing through the gum. Both cubs retain their four milk canines. The remaining teeth in the upper jaw, and all the lower jaw, are of the deciduous set. Both the cubs are males.—ALFRED HENEAGE COCKS (Great Marlow, Bucks).

SOOTY SHEARWATER OBTAINED IN IRELAND.—Through the good offices of my friend Mr. J. C. Neligan, of Tralee, I have lately had the opportunity of examining a specimen of the Sooty Shearwater (*Puffinus griseus*, Gmel.), which was killed many years ago off the Little Skellig rock, on the coast of Kerry, and has since been preserved in the collection of Mr. R. B. Chute, of Chute Hall, to whom I feel much indebted for his kindness in allowing this valuable specimen to be brought to Dublin. This is the bird which was first described as British by Mr. Arthur Strickland, in 1832, under the name of *Puffinus fuliginosus*, from a specimen shot at the mouth of the Tees; and which has been treated as the young or female of the Great Shearwater (*P. major*, Faber) by many of our best authorities. But, in his 'Birds of Europe,' Mr. Dresser identifies it with *P. griseus* of Gmelin, and considers it a species distinct from *P. major*. Though both birds are rare on the British coasts, *P. griseus* appears to be much the scarcer of the two, and has not hitherto been recorded as Irish.—A. G. MORE (Museum of Science and Art, Dublin).

ON THE REPORTED OCCURRENCE IN ENGLAND OF THE AMERICAN PIED-BILLED GREBE.—At a meeting of the Zoological Society on the 21st June last, Mr. R. B. Sharpe exhibited a specimen of *Podilymbus podiceps*, stated to have been killed at Radipole, near Weymouth, in the winter of 1880-81. Such an occurrence is highly improbable, not only from what is known of the habits of this bird,—which, although common in North, Central, and some parts of South America, has never, so far as I am

aware, been met with in Europe,—but also because the appearance of the specimen exhibited seemed to preclude the possibility of its having reached this country otherwise than in a preserved state. It is a young bird, with traces of the longitudinal dark stripes on the neck, which are observable in the young of all the Grebes. The birdstuffer from whom Mr. Sharpe received it must have made some mistake in supposing that it was killed near Weymouth, perhaps confounding it with the young of one of our British Grebes in a similar state of plumage which may have been sent to him from that neighbourhood. It is desirable that this should be noted, lest hereafter, in consequence of the published report of the exhibition of the specimen in question, there may be supposed to be grounds (which, in my opinion, do not exist) for regarding this species as an accidental wanderer to Europe.—J. E. HARTING.

THE FOOD OF BLACKBIRDS.—Do Blackbirds eat slugs? Most casual observers of Natural History will answer “yes.” But I ask, “Has any one positive evidence that slugs (by which I mean the soft, small white slugs so destructive in gardens) form part of the ordinary food of Blackbirds? On the other hand, trustworthy observers have told me that they are convinced that neither Blackbirds nor any other birds, except Ducks, will eat slugs. We know for certain that both Blackbirds and Thrushes at the beginning of winter feed eagerly upon shell-snails, and these are always mentioned amongst the ordinary food of these birds; but that veteran and trustworthy observer, the Rev. L. Jenyns, in his ‘Manual of Vertebrate Animals,’ does not include slugs amongst their food, though the destruction of slugs is mentioned incidentally amongst the merits of Blackbirds in the old edition of Yarrell’s ‘British Birds,’ and I believe this is repeated in the new edition now in the course of publication. One is apt to take such things for granted, and to suppose that the hundreds of Blackbirds and Thrushes found feeding under the leaves in wet turnip-fields, during September and October, must be looking for slugs; but when we are told on good authority that Blackbirds and Thrushes in confinement will not, though hungry, touch slugs, and they have been frequently observed to pass them over when feeding on lawns, and that common fowls avoid slugs, we are led to suppose that there may be something in them repugnant to the taste of most birds.—C. WOLLEY-DOD (Edge Hall, Malpas, Cheshire).

ENCOUNTER BETWEEN SPARROW AND MOUSE.—While the festivities in connection with the friendly societies were in progress at East Dereham, Norfolk, on June 7th, a curious scene was witnessed by some bystanders, awaiting the passing of one of the processions near the King’s Head Hotel. Their attention was attracted by seeing a sparrow in full flight from a neighbouring housetop, bearing in its mouth something almost as large as itself. On reaching the ground, this proved to be a live mouse, which, in

the course of a hard struggle, managed to release itself from the clutches of the bird, and a regular encounter at once commenced between the two, victory finally falling to the lot of the sparrow, and the poor mouse was apparently lifeless. This sparrow, however, was not permitted to carry off his spoil, if such was his intention, for some passers-by unconsciously put it to flight, and it mounted to its former place on the housetop. Here it surveyed its late antagonist, with an evident desire to renew the combat, and give the necessary *coup de grace*. This, however, it was not permitted to do, owing to the interruption of persons going to and fro. The mouse was either dissembling death, or was too much exhausted to move, for it remained quite motionless for some time. Finding it was left unmolested, it gradually recovered courage, commenced slowly to move, and finally beat a hasty retreat. It is supposed it was found by the sparrow in its nest, and that the above summary mode of eviction was resorted to.—‘*Eastern Daily Press*,’ June 9th. (Communicated by Mr. J. H. Gurney.)

SHORT-EARED OWL BREEDING IN CAMBRIDGESHIRE.—One day at the very end of June last, I was fortunate enough to discover a fine young Short-eared Owl, while crossing Wicken Fen, between Ely and Cambridge. It was of sufficient age to have left its nest, which I could not find, the sedge around being of a considerable height. When I went to touch it, it commenced a great hissing, accompanied by much snapping of the bill, and afterwards turned upon its back, going to work upon my hands with both bill and claws. Soon after I twice saw one of the old birds sailing about over the Fen, sometimes giving a curious subdued kind of bark. From Prof. Newton’s remarks in his edition of Yarrell, it seems that the last nest he heard of in the East of England was at Littleport, in the Isle of Ely in 1864.—ROBERT M. CHRISTY (Saffron Walden).

OCCURRENCE OF THE BLACKCAP IN CO. DONEGAL.—On the 21st of May last, I listened for some time to the song of the Blackcap, *Sylvia atricapilla*, amongst trees around Mr. Batt’s garden at Rathmullan House, upon the west shore of Lough Swilly. This warbler has not been previously noticed in Donegal. I have already recorded the appearance of the Wood Warbler in the same neighbourhood (Zool. 1878, p. 348). In the bleaker parts of the county, as at Carrablagh in Fenet, north of Rathmullan, other warblers, the Chiffchaff and the Willow Wren, appear early in the season more plentifully than they do later on, no doubt on their way to a more sheltered habitat, although a fair proportion of the latter remain to breed. The first-mentioned two are probably upon a similar passage.—H. CHICHESTER HART (71, St. Stephen’s Green, Dublin).

TREE PIPIT EJECTING CUCKOO’S EGG FROM ITS NEST.—On June 16th a case came under my notice of a Tree Pipit refusing to undertake the charge of a Cuckoo’s egg. My informant saw the Tree Pipit shovel the

Cuckoo's egg out of her nest with her bill, and early next morning he replaced it. When he took me to the nest a few hours afterwards we found the egg again turned out, the Cuckoo having laid another in the nest, which was now forsaken by the Tree Pipit. The nest, with the two Cuckoo's and three Tree Pipit's eggs, is now in my possession.—BRYAN HOOK (Farnham).

COMMON BUZZARD NEAR CROYDON.—On July 8th a male Buzzard was shot at Sanderstead, near Croydon, by Mr. Bridge's keeper. It seems strange that one should be in this neighbourhood at this season of the year.—PHILIP CROWLEY (Croydon).

KESTRELS NESTING IN HOLES IN TREES.—I have seen in Surrey this summer two Kestrel's nests in holes in trees, which is not a very usual site. One was about two feet down in an elm, the other about one foot down in an ash.—J. H. GURNEY, JUN. (Northrepps, Norwich).

[In the summer of 1876 a pair of Kestrels nested in the hollow of an old pollard at Bromley, Kent. The nest was not more than ten feet from the ground, and contained six eggs, four of which were taken, and the remaining two in due course hatched.—ED.]

WATER NEWTS IN THE CO. CORK.—Water Newts, *Lissotriton punctatus*, Bell, are to be seen in a pond near the village of Currieglass, in the County Cork, and have been seen in two or three other places near the pond. In Thompson's 'Natural History of Ireland,' it is stated that no species of Newt has been found in the Counties of Cork or Kerry.—CHARLES LONGFIELD (Church Hill, Desertserges, Bandon).

BASKING SHARK IN TORQUAY HARBOUR.—On the evening of June 21st a Shark was observed swimming about the inner harbour of Torquay, and after an exciting chase was at length gaffed and hauled into a boat. It proved to be a specimen of the Basking Shark, *Squalus maximus*, weighing about three hundredweight, and measured eight feet four inches in length and three feet eight inches round the body. The late Dr. J. E. Gray has the following statement, in his description of the genus:—"Scales with small curved points bent in all directions, so that the skin feels rough each way." But Dr. Fleming says that the Basking Shark is smooth when the hand is passed from head to tail. I have found by experiment on the Torquay specimen that Dr. Fleming was quite correct. Couch remarks that "the food of this fish is not known." According to an Orkney newspaper which he quotes, the Basking Shark does not object to "a mouthful of herrings." The captor of the Torquay specimen informed me that he

found in its stomach a John Dory; the skin was gone, but there was no difficulty in the identification. The Torquay specimen was very small and no doubt immature, for according to the Orkney paper already mentioned a specimen was taken near Whalsey, one of the Shetland Isles, 27·5 feet long and 16 feet thick. The liver yielded 165 gallons of oil, which was sold for £16 10s. Yarrell saw at Brighton a Basking Shark 36 feet long. One was taken in Cornwall that measured 31 feet 8 inches; and Lacepède speaks of one 33 feet in length and 24 feet in circumference. The Shark is valuable on account of the oil obtained from its liver. Fleming says the liver of a full-sized fish yields from eight to twelve barrels of oil; that of the Cornish specimen above referred to produced 198 gallons. Two examples at Broadhaven, in Scotland, yielded about nineteen barrels, of which eight make a ton. Judging from the Torquay specimen now under notice, Couch's figure of the tail is incorrect; he makes the length of the larger lobe bear to that of the smaller the ratio of 4 to 2, whereas it should be 4 to 3.—W. PENGELLY (Torquay).

REMORA, OR SUCKING-FISH, OFF THE CORNISH COAST.—On July 14th a Porbeagle Shark, nine feet long, was taken on a mackerel line, about twelve miles south of Deadmans, by the fishing-boat 'Willie,' Rolling, master. Mr. Dunn informs me that, on going on board the boat on its arrival at Mevagissey, he inquired of the men if they had seen anything of a little black fish clinging on to the Shark? One of them declared he had, and had thrown it into the sea. However, on Mr. Dunn looking in the boat, near the tail of the Shark, he discovered a *Remora*, which he kindly sent to me. It is 4½ inches in length, and in excellent preservation. The number of recorded instances in which British examples of the *Echeneis remora* have been captured are few. Turton states that he obtained one in 1806 at Swansea from the back of a cod-fish. In July, 1848, one was taken at Clontarf, Dublin Bay, adhering to the gills of a Blue Shark; and, in 1867, Mr. Dunn obtained the first specimen taken in England, also from a Blue Shark, about six miles distant from where the present one was captured.—FRANCIS DAY (Pittville, Cheltenham).

RARE FISHES ON THE CORNISH COAST.—On June 21st I received, from Mr. Dunn, of Mevagissey, in Cornwall, a small specimen of Maigre, *Sciæna aquila*, 23 in. in length, which had been captured the previous day in a trammel. He observed that these fishes arrive off the Cornish coast about the spring of the year, in company with the Bass, *Labrax lupus*, which at this season are feeding on the young of the Herring, Sprats, and other fishes, and it therefore seems a fair presumption that they indulge in similar food. Externally, and in colour, the two forms somewhat resemble one another, and it is not improbable that many Maigre may have been captured, but overlooked. On June 2nd Mr. Dunn likewise forwarded to

me a beautiful example of Couch's "Dotted Mackerel," a variety in colour of the common form. It was $10\frac{1}{2}$ in. in length, and a female, in which the ova were not quite ripe for shedding. With it he also sent one of Couch's "Scribbled Mackerel," another variety in colour of the common form, and which Couch considered to be a distinct species, a conclusion I expressed a doubt upon in my 'Fishes of Great Britain and Ireland,' p. 85. Without entering into details in this place, I may mention that the only difference between *Scomber scriptus* and *Scomber scomber* is one of colour, it being merely a variety as respects its markings. On June 2nd Mr. Dunn also informed me that a Spinous Shark, *Echinorhinus spinosus*, had been taken sixteen miles off Deadmans, on a line with mackerel bait. When hooked it was swimming at the sea bottom. Although this fish is not a common visitor to our shores, still it cannot be considered as very rare. One was taken prior to 1828 on the Yorkshire coast; in the summer of 1830 one was taken in Filey Bay, Yorkshire; in July, the same year, another near Land's End; in 1837 a third was trawled off Brixham; early in November, 1838, one was caught on a line off Berry Head; and December, 1849, another in a trawl net off Falmouth Harbour. In 1851 a dead one was cast ashore at Gamrie, in the Moray Firth. Besides the foregoing, the following have been recorded:—December, 1865, a male, 6 ft. 2 in. long; September 7th, 1870, one, 8 ft. 3 in. long; May, 1875, one, 5 ft. 1 in. long; and January, 1877, a fourth, 8 ft. long, all reported by Mr. Cornish from Mount's Bay. In 1869 one was captured off the mouth of the Tyne, and a female, about 6 ft. long, at or near the same spot, in a salmon-net in July, 1876, and which is now in the Newcastle Museum. In 1874 Turner recorded one from the Bass Rock, and Mr. Gatcombe likewise, in January, 1877, observed an example, $6\frac{1}{2}$ ft. long, taken off Plymouth, while it has been also taken at Brixham. The foregoing instances, to which several more might be added, show that this fish may be present at any period of the year: that it is mostly captured by baits while it swims near the bottom, being, in fact, a ground Shark. However, before concluding these observations, I wish to remark on some beautiful Gurnards shown me by Mr. Carrington at the Westminster Aquarium, and which had recently been received from the south coast. The size of the young of the sapphirines varied, but the inner side of the pectoral fins in all were of a lovely light, almost emerald-green, tinted with blue, while in the smaller ones the pectoral blotch was of a dark purple with milk-white spots; as the size of the fish increases this blotch by degrees disappears, as may be distinctly observed in the beautiful living series. There were also some fine examples of the Elleck, or "Cuckoo Gurnard," the body of each being transversely marked with four wide dark bands wider than the red-ground colour. On July 2nd Mr. Dunn sent me another variety of the common Mackerel, *Scomber scomber*, captured that day, and called by the fishermen

"a Mackerel without markings," being the second landed at Mevagissey this season. When first seen, Mr. Dunn observes that it had twenty-five oblique dark lines (very indistinct) above the lateral line. On arrival at Cheltenham these lines were hardly visible. The example was $14\frac{1}{2}$ inches in length, in pretty good condition, a female which had spawned, and in which no air-bladder existed. It is very interesting as demonstrating that not only may the black markings be variously altered, as in the dotted and scribbled forms, but even be entirely wanting, as observable in this specimen.—FRANCIS DAY (Pittville, Cheltenham).

ERRATUM.—In my notice of the National Fisheries Exhibition lately held at Norwich, 'Zoologist' for June last, p. 251, fourth line from the bottom, for "Fakenham," read "Lakenham."—T. SOUTHWELL.

SIR JOHN LUBBOCK ON THE HABITS OF ANTS.—At the meeting of the Linnean Society on June 2nd Sir John Lubbock read a further paper on this subject. He said that in one of his former essays (Linn. Soc. Journ., vol. xiv., p. 278) he had given a series of experiments made on Ants with light of different colours, in order, if possible, to determine whether Ants had the power of distinguishing colours. For this purpose he utilised the dread which Ants, when on their nest, have of light. Not unnaturally, if a nest is uncovered, they think they are being attacked, and hasten to carry their young away to a darker, and as they suppose a safer, place. He satisfied himself, by hundreds of experiments, that if he exposed to light most of a nest, but left any part of it covered over, the young would certainly be conveyed to the darker portion. In this manner he satisfied himself that the different rays of the spectrum act on them in a different manner from that in which they affect us; for instance, that Ants are specially sensitive to the violet rays. But he was anxious to go beyond this, and to attempt to determine how far their limits of vision agree with ours. We all know that if a ray of white light is passed through a prism, it is broken up into a beautiful band of colours—the spectrum. To our eyes it is bounded by red at the one end and violet at the other, the edge being sharply marked at the red end, but less abruptly at the violet. But a ray of light contains, besides the rays visible to our eyes, others which are called, though not with absolute correctness, "heat rays" and "chemical rays." These, so far from being bounded by the limits of our vision, extend far beyond it—the heat rays at the red, the chemical rays at the violet end. He wished, under these circumstances to determine, if possible, whether the limits of vision in the case of ants was the same as with us. This interesting problem he endeavoured to solve as follows:—If an Ants' nest be disturbed, the Ants soon carry their grubs and chrysalises under-ground again to a place of safety. Sir John, availing himself of this habit, placed

some Ants with larvæ and pupæ between two plates of glass about one-eighth of an inch apart, a distance which leaves just room enough for the Ants to move about freely. He found that if he covered over part of the glass with any opaque substance the young were always carried into the part thus darkened. He then tried placing over the nest different coloured glasses, and found that if he placed side by side a pale yellow glass and one of deep violet, the young were always carried under the former, showing that though the light yellow was much more transparent to our eyes it was, on the contrary, much less so to the Ants. So far he had gone in experiments already recorded. But he now wished, as already mentioned, to go further, and test the effect upon them of the ultra violet rays, which to us are invisible. For this purpose, among other experiments, he used sulphate of quinine and bisulphide of carbon, both of which transmit all the visible rays, and are therefore perfectly colourless and transparent to us, but which completely stop the ultra violet rays. Over a part of his nest he placed flat-sided bottles containing the above-mentioned fluids, and over another part a piece of dark violet glass; in every case the larvæ were carried under the transparent liquids and not under the violet glass. Again, he threw a spectrum into a similar nest, and found that if the Ants had to choose between placing their young in the ultra violet rays or in the red, they preferred the latter. He infers therefore that the Ants perceive the ultra violet rays which to our eyes are quite invisible. Now, as every ray of homogeneous light which we can perceive at all appears to us a distinct colour, it seems probable that these ultra violet rays must make themselves apparent to the Ants as a distinct and separate colour (of which we can form no idea), but as unlike the rest as red is from yellow or green from violet. The question also arises whether white light to these insects would differ from our white light in containing this additional colour. At any rate, as few of the colours in nature are pure colours, but almost all arise from the combination of rays of different wave-lengths, and as in such cases the visible resultant would be composed not only of the rays which we see, but of these and the ultra violet, it would appear that the colours of objects and the general aspect of nature must present to them a very different appearance from what it does to us. Similar experiments which Sir John also made with some of the lower Crustacea points to the same conclusion, but the account of these he reserved to a future occasion. He then proceeded to describe some experiments made on the sense of direction possessed by Ants, but it would not be easy to make these intelligible without figures. After detailing some further experiments on the power of recognising friends, he gave some facts which appear to show that Ants by selection of food can produce either a queen or a worker at will from a given egg. Lastly, he stated that he had still some Ants which he had commenced to observe in 1874, and which are still living and in perfect

health; they now therefore must be more than seven years old, being by far the oldest insects on record.

DWARF SWIMMING CRAB AT PENZANCE.—After waiting for it many years, I have at length obtained a specimen of the Dwarf Swimming Crab, *Portunus pusillus*. I do not know, nor shall I be able to discover, where it came from, but as I found it on my doorstep in the heart of Penzance, I may assume that it probably came from Mount's Bay. It is a large specimen, but I do not give measurements because, having been flattened by the pressure of some heavy substance, probably a fishwoman's "cowl" or basket, it looks larger than it was in life. It is unfortunately unfit for preservation, but not by any means damaged beyond identification.—THOS. CORNISH (Penzance).

DEVELOPMENT OF THE CTENOPHORA.—In accordance with his usual practice of making his anniversary address an exposition of recent progress in some department of zoological research, the President (Prof. Allman), at the meeting of the Linnean Society on May 24th last, selected as his subject the advances which during late years had been made in our knowledge of the development of the Ctenophora, those gelatinous transparent organisms which swim by means of rows of cilia, mostly disposed in comb-like plates, or ctenophores. He referred especially to the beautiful researches of Alexander Agassiz, and to those of Fol, Kowalewsky, and most recently of Chun. He pointed out the phenomenon to which he was himself the first to call attention, that immediately after the earliest stages of the egg-cleavage a remarkable peculiarity shows itself, in the fact that the cleavage is no longer uniform, but takes place more energetically in certain cleavage spheres than in other, whereby the former are broken up into a multitude of small cells which gradually envelop the latter, thus giving us at this early period of embryonic development the foundation of the two germinal leaflets, ectoderm and endoderm. He showed how the body thus formed becomes excavated by an external cavity which soon communicates by an orifice with the exterior, thus presenting, as shown especially by the researches of Chun, the condition of a *gastrula*; how the gastrula-mouth becomes afterwards closed by the continued extension over it of the ectoderm; how a new orifice, the permanent Ctenophore-mouth makes its appearance at the opposite hole, the ectoderm here becoming invaginated so as to form the permanent stomach which opens into the central cavity, which becomes the "funnel" from which spring all the vessels which are destined to distribute the nutritive fluid through the body; how in the spot formerly occupied by the gastrula-mouth certain cells of the ectoderm become differentiated so as to form the rudimental

nervous system; and how the great vascular trunks are formed by the differentiation of portions of the endoderm, into which offsets extend from the central cavity. Prof. Allman further referred to the facts connected with the metamorphoses which the larvæ of the Ctenophora undergo between the moment of leaving the egg and the attainment of the mature form—facts for which we are mainly indebted to the researches of Alexander Agassiz and of Chun. He showed how the lobed section of the Ctenophora, as proved by the investigations of A. Agassiz on *Bolina*, and by those of Chun on *Eucharis*, are at first quite destitute of the “lobes” which constitute so characteristic a feature in the adult; and how the young Ctenophore has at this time all the characters of the more simply constructed Cydipidæ, *Eucharis* being also compressed like a *Mertensia* in the direction of the stomach-axis, while in the adult the compression of the body is at right angles to this; how the lobes afterwards grow out laterally from the oval side of the body; how the meridional vessels at first ending in blind extremities extend themselves into the rudimental lobes, and there form the anastomoses and rich convolutions which become so striking in the adult, the stomach-vessels finally entering into the anastomoses. He also referred to Chun’s remarkable discovery of the sexually mature condition of the very early larva of *Eucharis*, from which was reared a young brood which returned to the larvæ form from which it originated. Chun’s observations on the metamorphoses of the Venus’s-girdle (*Cestum veneris*) were also dwelt on. It was shown how the young *Cestum* had a nearly globular form and possessed all the essential features of the Cydipidæ, so that notwithstanding the extremely aberrant characters of the adult the young may be taken as affording a type of the gastro-vascular system with the distribution of the vessels in the Ctenopora generally. The gradual extension of the Cydippe-like larvæ in the direction of the funnel-plane changes it into the long flattened, band-like form of the adult, and brings about (with modifications in the number and direction of the swimming-plates, and the substitution of new tentacles to replace those of the larva which had disappeared) the singularly aberrant course of the vessels characteristic of the mature Venus’s-girdle.

THE LATE PROFESSOR ROLLESTON, M.D., F.R.S.—The report of the death at Oxford of Professor Rolleston, in June last, came too late for notice in the July number of this journal; and although by the time these lines are in the hands of our readers the intelligence will have long before reached them, we nevertheless do not hesitate to refer to it, not by way of news, but in order to pay a humble tribute to the memory of a distinguished zoologist. As Linacre Professor of Anatomy and Physiology at Oxford, Professor Rolleston was widely known and deservedly respected, while to

all students of the science which he taught his name is of course familiar as that of the author of 'Forms of Animal Life,' a work which has been commended by a high authority as "one of the earliest and most complete examples of instruction by the study of a series of types now becoming so general." Educated at Pembroke College, he took a First Class in Classics in 1850, and was elected a Fellow of his College in 1851; and after studying Medicine for some time at St. Bartholomew's Hospital, returned to Oxford on his appointment as Lee's Reader in Anatomy at Christchurch. In 1860 he was elected to the Linacre Professorship above referred to, a post which he continued to fill at the time of his death. With extraordinary mental acquirements and great energy, Dr. Rolleston not only never shirked, but continually courted, hard work, and it is to be feared that the close and continuous application which appeared to him to be a necessity must have contributed in no slight degree to the ailments which resulted in his death. His loss will be deplored not only by a wide circle of friends and acquaintances by whom he was deservedly esteemed, but also by that section of the general public who, knowing him only by his published writings, had long learned to regard him as a thoroughly reliable guide and instructor in the sciences of which he was Professor. In addition to his 'Forms of Animal Life,' which appeared in 1870 (a new edition of which, we believe, was in preparation at the time of his death), he published several valuable papers in the Proceedings and Transactions of Scientific Societies and other journals. Amongst these may be mentioned a paper "On the Affinities of the Brain of the Orang-Utang" (Nat. Hist. Review, 1861); "Remarks on the Value of the Placental System of Classification" (Trans. Zool. Soc., 1866); "On the domestic Cats of Ancient and Modern Times" (Journ. Anatomy, 1868); "On the homologies of certain muscles connected with the shoulder-joint" (Trans. Linn. Soc., 1870); "On the development of the Enamel in the Teeth of Mammals" (Quart. Journ. Microsc. Soc., 1872); "On the domestic Pig in Prehistoric Times" (Trans. Linn. Soc., 1877); and "On the Modifications of the External Aspects of Organic Nature, produced by Man's interference" (Journ. Geogr. Soc., 1879).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

June 7, 1881.—Prof. H. W. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary called the attention of the meeting to the opening of the Insectarium in the Society's Gardens, which had taken place on the 25th April, and read a report on the insects that had been reared and exhibited there, drawn up by Mr. Watkins, the Superintending Entomologist.

Mr. F. M. Balfour read a paper on the development of the skeleton of the paired fins of the Elasmobranchs, considered in relation to its bearings on the nature of the limbs of the Vertebrata. The object of the investigations recorded in this paper was explained by the author to be twofold—*viz.*, on the one hand, to test how far the study of the development of the skeleton of the fins supported the view which had previously been arrived at by the author, to the effect that the paired fins were the specialised and highly developed remnants of a once continuous lateral fin on each side; and, on the other, to decide between the views of Gegenbaur and Huxley and Thacker and Mivart as to the primitive type of fin-skeleton. The author pointed out that the results of his researches were entirely favourable to the view that the paired fins were structures of the same nature as the unpaired; and that they gave a general support to the views of Thacker and Mivart. They clearly showed that the pelvic fins retained more primitive character than the pectoral. Conclusions were drawn somewhat adverse to the views recently put forward on the structure of the fin by Gegenbaur and Huxley, both of whom considered the primitive type of fin to be most nearly retained in *Ceratodus*, and to consist of a central multi-segmented axis with numerous rays on its two sides. It appeared, in fact, that the development of the skeleton demonstrates that a biserial type of fin like that of *Ceratodus* could not have been primitive, but that it must have been secondarily derived from a uniserial type, by the primitive bar along the base of the fin (the “*basipterygium*”) being rotated outwards, and a second set of rays being developed on its posterior border.

Mr. W. T. Blanford read some notes on a collection of Persian Reptiles recently added to the British Museum, amongst which was an example of a new species of Lizard, proposed to be called *Agama persica*.

A communication was read from the Rev. O. P. Cambridge on a new Spider of the family *Theraphosidæ*. The chief interest attaching to this Spider was the fact that it had lived in the Gardens of the Society from March to October, 1880. Mr. Cambridge proposed to name the species *Homæomma Stradlingii*, after Dr. Stradling, who had brought home from Bahia the specimen in question.

Mr. G. E. Dobson read a paper on the pharynx, larynx, and hyoid bones in the *Epomophori*, indicating some very remarkable peculiarities of structure, in which these Bats appear to differ not only from all other Chiroptera, but from all other mammals. Pharyngeal air-sacs were also described in the males of *Epomophori monstrosus*, *franqueti*, and *comptus*.

Mr. J. Gwyn Jeffreys read the third of the series of his memoirs on the Mollusca procured during the ‘Lightning’ and ‘Porcupine’ expeditions 1868-70. The present paper contained an account of the families from *Kelliidæ* to *Tellinidæ*. Eleven new or hitherto unfigured species were

described. The geographical, hydrographical, and geological distribution of the species enumerated were fully given.

Mr. F. C. Selous read a paper on the South African Rhinoceroses, based upon specimens collected and observations made during nine years' hunting in Southern and South-central Africa. Mr. Selous had come to the conclusion that in these countries only two well-marked species of *Rhinoceros* existed, namely, the square-mouthed *Rhinoceros simus*, and the prehensile-lipped *R. bicornis*.

June 21, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1881, amongst which special attention was called to an African Wild Ass (*Equus taniopus*) from Upper Nubia, and a White-winged Duck (*Anas specularis*) from Antarctic America, both new to the collection.

Mr. R. Bowdler Sharpe exhibited a specimen of *Podilymbus podiceps*, stated to have been killed at Radipole, near Weymouth, in the winter of 1880-1.*

Mr. W. A. Forbes read a paper on the Petrel called *Thalassidroma nereis*, by Gould. This, he showed, was not a true *Procellaria*, but must form the type of a new genus, proposed to be called *Garrodia*, most closely allied to *Oceanites*, *Fregetta*, and *Pelagodroma*, and constituting with them a distinct family of "*Tubinares*," proposed to be called "*Oceanitidæ*."

Mr. W. A. Forbes read a paper on the conformation of the thoracic extremity of the trachea in the "Ratite" birds, calling particular attention to the existence of a highly-developed syrinx in the genus *Rhea*, in which respect it differed from all the other genera comprised in that group.

A communication was read from Mr. George F. Bennett containing an account of the habits of the *Echidna hystrix* of Australia, as observed by him during three years' exploration of their native haunts.

Mr. G. A. Boulenger read a paper on the Lizards of the genera *Lacerta* and *Acanthodactylus*, prepared after a study of the specimens of these genera in the collection of the British Museum.

Mr. F. C. Selous read a paper in which he gave an account of the Antelopes that had come under his observation during a residence of eight years in central South Africa. The author exhibited a series of skins of the Bush-buck (*Tragelaphus sylvaticus*), and pointed out their variations in different localities, also specimens of the Poku (*Cobus Vardoni*) and Speke's Antelope (*Tragelaphus Spekii*).

* For some additional remarks on this specimen, see "Occasional Notes."

A communication was read from the Rev. O. P. Cambridge, containing an account of some new genera and species of *Araneidea*.

Mr. Sclater pointed out the generic divisions of the *Bucconidæ* which he proposed to adopt in his Monograph of the group now approaching completion, and characterised a new species of the family under the name *Nonnula cineracea*.

Mr. R. Bowdler Sharpe communicated some notes on new or rare species of Flycatchers lately added to the collection of the British Museum, principally from the Gould collection. The new species described were proposed to be called *Malurus cyanochlamys*, *Siphia obscura*, and *Rhipidura Macgillivrayi*.

A second paper by Mr. Sharpe contained an account of several collections of birds formed by Mr. W. B. Pryer in the district of Sandakan, in North-eastern Borneo. Two new species were described as *Lanius Schalowi* and *Dicaeum Pryeri*.

Lieut.-Col. H. H. Godwin-Austen read the second portion of his paper on the Land Shells collected by Prof. J. Bayley Balfour during his recent expedition to the Island of Socotra. The present paper contained an account of the family *Helicaceæ*.

Mr. G. E. Dobson communicated some notes on certain points in the muscular anatomy of the Green Monkey (*Cercopithecus callithrix*).

Dr. A. Günther exhibited and read a description of a specimen of *Schedophilus medusophagus*, a Mediterranean fish new to the British fauna, lately captured off the coast of Ireland.

This meeting closes the present session. There will be no more scientific meetings until next November, when the session for 1881-82 will commence.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 1, 1881.—H. T. STAINTON, Esq., F.R.S., &c., President, in the chair.

The Rev. E. N. Bloomfield, M.A. (Guestling Rectory, Hastings, Sussex), was balloted for and elected an Annual Subscriber to the Society.

Mr. J. Jenner Weir, on behalf of Mr. J. W. Douglas, read some notes on various Homoptera, and exhibited the specimens referred to.

Mr. T. R. Billups exhibited a long series of *Crabro clavipes*, Linn., bred this year from *Cynips Kollari* galls, collected at Wimbledon. Also a specimen of *Molorchus minor*, Linn., taken at Headley Lane on May 9th last, feeding on larch. Mr. Billups observed that this Longicorn was apparently rare in Britain, as Dr. Power had only met with one specimen, this also on larch, and that Mr. Douglas took two at Headley Lane sixteen years ago.

Mr. E. Saunders said he took a specimen of *M. minor* at Wandsworth the year before last.

Mr. John Sang, who was present as a visitor, exhibited some varieties of British Lepidoptera.

The Secretary read a communication from Mr. G. E. Piercey, asking for the identification of an insect noxious to travellers in Central Asia, and lately mentioned by the 'Daily News' special correspondent amongst the Tekké Turcomans, under the name of "shep-quez" (—"bite the stranger").

Mr. E. A. Fitch thought most probably the creature referred to was the *Argas persicus* of Fischer de Waldheim; the habits of this tick and the effects produced by its attack, as related by Kotzebue and Dupré, agreeing fairly well with the account given in the correspondent's extracts.

Mr. W. F. Kirby remarked that the symptoms of the bite of the so-called "poisonous bug" of Persia (*Argas reflexus*), as described at a previous meeting, so much resembled those of malignant pustule—a disease well-known to be conveyed by flies—that it would be important to ascertain whether the bite of the *Argas* was itself venomous or merely a vehicle for the conveyance of morbid matter.

The Secretary then read the report of the committee appointed at the last meeting to enquire into the supposed presence of the *Phylloxera* on the vines in Victoria.

The Secretary next read a communication from the Colonial Office, enclosing a report from Her Majesty's Vice-Consul at the Dardanelles, respecting the appearance in the Troad of an insect alleged to be destructive to the locust eggs; and asking for an opinion as to the possibility of the introduction of this insect, should its habits be correctly described, into Cyprus.

The President stated that this communication had been considered by the Council of the Society, and they had resolved that Sir Sidney S. Saunders, Messrs. C. O. Waterhouse, and E. A. Fitch be appointed a committee to investigate the subject and report.

Lord Walsingham read a paper entitled "The *Tortricidæ*, *Tineidæ*, and *Pterophoridæ* of South Africa," which included a complete list of the described South African species, characterizing several as new, which had lately been collected by Mr. W. D. Gooch in Natal, and made remarks on the affinities and general geographical distribution of the species, a few of which were exhibited.

Mr. A. G. Butler communicated a memoir "On the genus *Sypna* of Guénée, a group of Lepidoptera of the tribe Noctuites."

Mr. W. L. Distant communicated "Descriptions of Rhynchota from the Australian and Pacific Regions," including, with other *Pentatomidæ*, four new species of the genus *Menida* from Australia.

July 6, 1881.—H. T. STANTON, Esq., F.R.S., &c., President, in the chair.

Mr. George Henry (38, Wellington Square, Hastings) was balloted for and elected an Ordinary Member of the Society. Mr. A. S. Olliff (36, Mornington Road, Regent's Park, N.W.) was elected an Annual Subscriber to the Society.

Mr. W. L. Distant exhibited the sexes of *Morpho Adonis*, Cram.; the female of this butterfly apparently had previously been quite unknown.

Miss E. A. Ormerod exhibited some elm-leaves received from Islay, Argyllshire, which were almost bleached, the parenchyma being cleared away by minute larvæ; also several sawfly larvæ from a meadow at Rochdale, Lancashire, where they were committing extensive ravages; specimens of a sawfly larva from Clitheroe, Lancashire, received with the *Noctua* larvæ now so destructive to grass in that district; and specimens of a sawfly larva received from Marlborough, Wilts, where it is attacking the wheat. Miss Ormerod also exhibited living specimens of the *Noctua* larvæ, which lately occurred as a "plague" at Clitheroe, and observed that these differed somewhat from the published descriptions of the larva of *Charæa graminis*.

Mr. Stainton remarked that he did not with certainty know the larva of *C. graminis*, but believed those now exhibited belonged to that species; with regard to the elm-leaf blotchers, he did not recognise them as Micro-Lepidopterous, but thought possibly it was a Coleopterous larva attacking them.

Mr. E. A. Fitch recognised the sawfly larvæ from Rochdale as belonging to the *Doleridæ*, and said that he had received similar larvæ from Romford, Essex, and Huddersfield, Yorkshire; in both localities they were sent as doing damage to the grass crops; he also observed how little was known of the life-histories of the numerous species of *Dolerus*.

The Rev. A. E. Eaton exhibited drawings by Mr. A. T. Hollick, illustrating some *Ephemeridæ* nymphs in Dr. Hagen's collection.

Sir Sidney S. Saunders exhibited several female specimens, with larvæ and pupa-case of *Callostoma fascipennis*, Macq., received from Mr. Frank Calvert of the Dardanelles; the larva of this fly lives in the egg-cases of locusts and feeds on the eggs. Several of these egg-cases and a young locust (*Caloptenus italicus*), but two days old, which had been bred by Mr. F. Enock, were exhibited.

The Secretary read the report of the Committee appointed at the last meeting to enquire into the history of the insect feeding on the locust-eggs in the Troad, respecting which a communication had been received from the Colonial Office.

Mr. F. Moore communicated some "Descriptions of new Asiatic diurnal Lepidoptera."

Mr. D. Sharp sent a communication "On the species of the genus *Euchroma*," having reference to the two known species belonging to that genus of the *Buprestidæ*.

Mr. J. W. Douglas communicated "Observations on the species of the Homopterous genus *Orthezia*, with a description of a new species" (*O. Normani*).

Mr. A. G. Butler communicated a further paper "On the Lepidoptera of the Amazons collected by Dr. James W. H. Trail during the years 1873 to 1875," Part IV. Geometrites. This part of the collection consists of eighty-two species, thirty of which prove new to Science.

Prof. Westwood communicated "Notes on larva of *Nycteribia*," by Baron R. Osten-Sacken.

Mr. W. F. Kirby read "Notes on new or interesting species of *Papilionidæ* and *Pieridæ* collected by Mr. Buckley in Ecuador."—E. A. FITCH, *Hon. Sec.*

NOTICES OF NEW BOOKS.

The Norwegian North Atlantic Expedition, 1876-78: Zoology—Fishes. By ROBERT COLLETT. Large 4to, pp. 164, with five plates, three woodcuts, and map. Christiana: Grondahl and Son.

IN this handsome quarto volume, with most carefully executed lithographs, we have a section of the General Report on the Zoological Results of the Expedition organised by the Norwegian Government for the Scientific Exploration of the North Atlantic. This Expedition made three voyages in the years 1876, 1877 and 1878, and several preliminary memoirs have been published in various scientific Journals, dealing briefly with the chief results obtained in different branches of scientific research. Two of these papers, by Mr. Collett, relating to the Deep-sea Fishes collected on the Expedition, were published in 1878, but without illustrations. Having been carefully revised and considerably expanded, they are now embodied in the more important quarto before us.

During the first two voyages of 1876 and 1877, the number of fishes obtained was comparatively small, while the additions made to our knowledge of invertebrate forms were both numerous and important. The small number of fishes collected was believed to be due to the unsuitable nature of the dredging-apparatus at first employed, as well as to the fact that, in 1876, the investigations were carried on almost exclusively at great depths in the cold

area between Norway and the shores of Iceland, where the marine fauna is less rich, perhaps, than in some localities farther north. In the summer of 1877, when the results were somewhat greater, the operations were carried on in shallow water, partly on the banks off the Norwegian coast, and partly in the neighbourhood of Jan Mayen Island.

The ichthyological results from the first two voyages having thus proved less satisfactory than was anticipated, especial care was taken, when fitting out the Expedition for the final voyage in 1878, to provide apparatus which should be adapted for securing not only the various species of invertebrate animals which might be met with, but also the deep-sea fishes which there was reason to believe would be found, were suitable apparatus employed for taking them. A special form of trawl-net was therefore constructed, and, in localities where it could properly be worked, was employed with considerable success. Mr. Collett reports that fishes were brought up at well-nigh every haul, sometimes only two or three perhaps, but more frequently a larger number; the net being worked at various depths down to 1400 fathoms.

The region investigated in 1878 comprised, southward, the tract between Hammerfest and the Varanger Fjord, eastward and westward the expanse of ocean stretching towards Novaja Zemlia and Jan Mayen, and northward that extending to the north-western extremity of Spitzbergen.

The number of species collected on this the final voyage amounted in all to thirty-three, of which six proved to be new to Science. Of the eleven species obtained on the two preceding voyages, ten were again met with, including a new species of *Lycodes*, i. e., *L. muræna*. Several representatives of this genus were unexpectedly found to occur at considerable depths. *Lycodes frigidus*, for example, one of the newly-described species, was brought up from depths varying from 600 to 1300 fathoms, and almost exclusively in spots where the temperature of the water was below zero.

The seven species regarded by Mr. Collett as new are *Raia hyperborea*, *Liparis bathybi*, *Lycodes frigidus*, *Lycodes pallidus*, *Lycodes lütkeni*, *Lycodes muræna*, and *Rhodichthys regina*, the last mentioned representing a new genus.

The Expedition has thus brought to light seven new species and one new genus, all of them true forms of deep-sea fishes.

These are all figured by Mr. Collett in the present work, together with several other species more or less rare. So far as can be judged without actual comparison with the specimens, the plates strike us as being most carefully and accurately executed. With the exception of *Rhodichthys*, they are uncoloured, but as full details of the coloration are included in the description of each species, there can be no difficulty in identification.

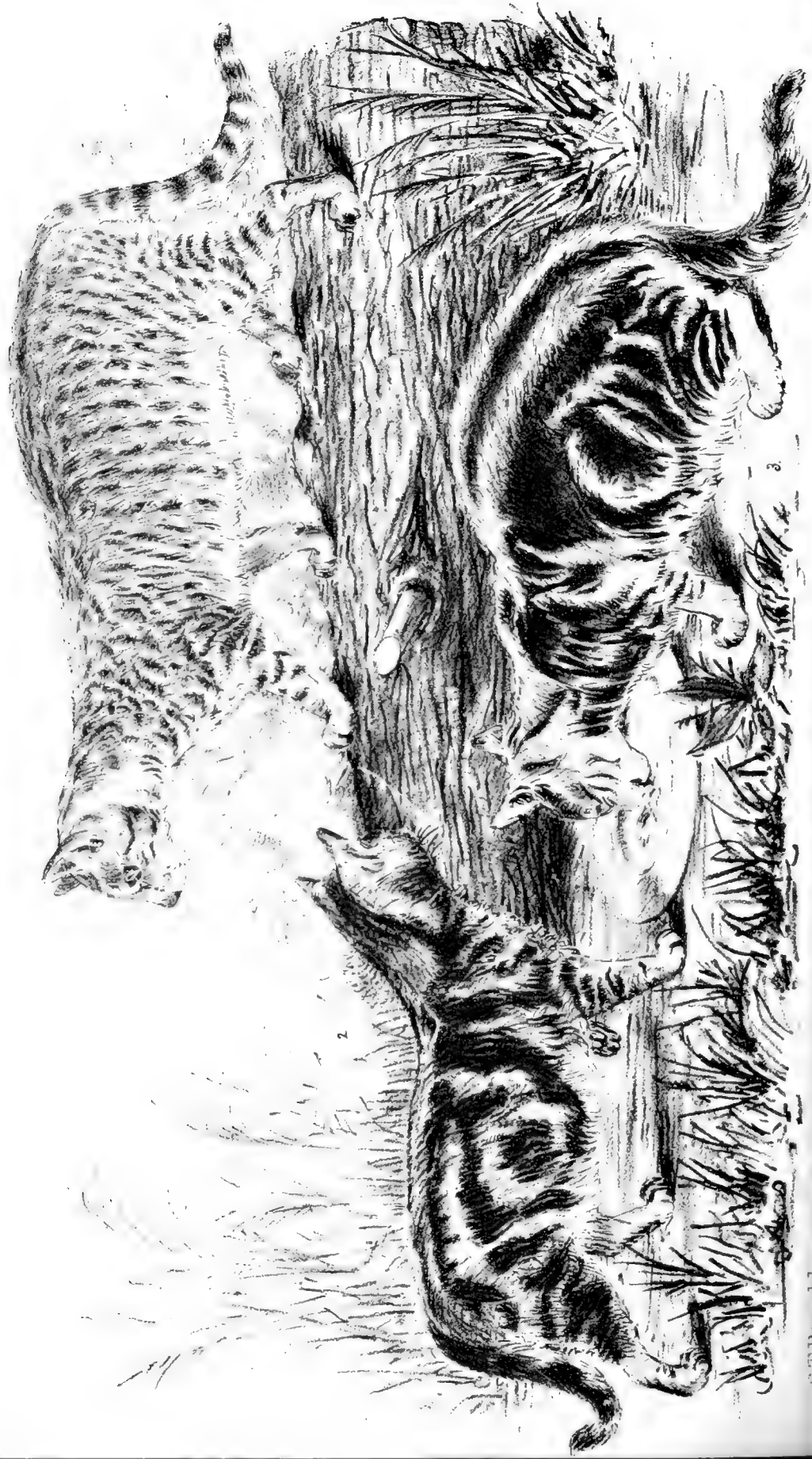
In most of the specimens collected, Mr. Collett, assisted by Prof. Sars, was careful to examine the contents of the stomach, an examination which, he tells us, proved of considerable interest, not only by contributing to our knowledge of the distribution of divers invertebrate species in northern latitudes, but also from its having substantiated the very remarkable fact that several of these pelagic forms of animal life, whose habitat was generally believed to be near the surface, possess the power of descending to the greatest depth in which deep-sea fishes have been met with, where they attain even a larger size than those taken in the upper strata of the water.

The labours of ichthyologists within the last few years have brought to light a number of new forms belonging to the genus *Lycodes*, which is now found to comprise a greater number of species than any of the other Arctic deep-sea fishes yet known.

To work out the new species of this genus collected by the North Atlantic Expedition, and to determine their precise relationship to types already established, must have been no easy task; and some idea of the labour bestowed by Mr. Collett on this report may be gained by reference—for instance—to his remarks upon this genus (pp. 77—84), wherein, after pointing out some of the difficulties to be contended with, he gives a critical review of the bibliography of the genus, and a tentative summary of the species, of which he recognises eighteen. In this single chapter we have good evidence of the careful way in which Mr. Collett has drawn up his Report, which in every respect is an important contribution to ichthyological science.

We have only to add that, being wisely printed in Norwegian and English, in parallel columns, it cannot be regarded as a sealed book to English readers, like many valuable scientific memoirs of Scandinavian origin which have preceded it.





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ON THE COLOUR AND DISPOSITION OF MARKINGS IN THE DOMESTIC CAT.

By G. T. ROPE.

THE following fact with regard to the markings of the Domestic Cat strikes me as being rather curious, and is I think worthy of notice. I have never come across any allusion to it in any work treating of this animal, although it may, notwithstanding, have been pointed out before. All Cats of the "harmless necessary" kind, including the long-haired varieties and the Manx Cat, are I believe universally supposed to be descended from one species, and one only, although what that species is has never been satisfactorily determined.

Broadly speaking, there are two distinct patterns, if I may so call them, to which the markings of all coloured cats may be referred, for, with the exception of white ones, all may be said to be tabby; that is, they are marked with two shades of colour, a light and a dark one, disposed according to one of the two patterns I will attempt to describe, the markings of the face, and to some extent that of the chest and legs, being common to both patterns. Great as is the variety of colour among Domestic Cats, the markings of each individual will always be found to be disposed, as mentioned above, after one of these two distinct plans, which, though often somewhat modified and varied in different animals, are never so much so but that the general arrangement is at once apparent. Black cats form no exception

to this rule, but all I believe belong to one or the other of these patterns, for though when full grown the stripes are sometimes not perceived without difficulty, yet in most blacks they are discernable in certain lights. In black kittens they are often easily to be seen, but, as in the case of the cubs of the Lion, they become fainter as the animal grows older, but do not often, I believe, wholly disappear, as do the leonine stripes; the two shades (like those seen in the fur of the so-called black variety of the Leopard) approach each other so nearly in depth as to be not easily distinguished.

Pattern 1, which approaches nearest to that seen on the fur of the Wild Cat, and is often to be found in nearly the same colours, is I believe sometimes called "tiger-striped" to distinguish it from the other kind of tabby, though, excepting in the vertical direction of the stripes on the sides, it has in reality not much resemblance to a Tiger's markings, but approaches nearer, I think, to those of the Serval. The lighter of the two tints forms the ground colour, which is adorned with darker markings, consisting of a dorsal line, often split into three, in which case the two outer ones are slightly broken into spots, which form a sort of starting-point for the narrow stripes which branch out nearly at right angles to the spine, partaking in some cats more of the character of spots than stripes. The dorsal line does not extend unbroken further forward than to a point between the shoulder-blades, sometimes not so far, being always most perfect over the loins; it is in some cases rather obscure by reason of the ground colour being (as is the case with most mammals) darkest on the top of the back, without, in the present case, a corresponding variation in the depth of the markings, in consequence of which the two tints along the spine are often nearly the same. The shoulders are covered with narrow wavy lines, the arrangement of which it is difficult to describe, but the curves of which harmonise in a beautiful manner with each other and those next to them. The stripes on the hind quarters are directed forwards and downwards, excepting those at the extreme posterior edge of the hams, the direction of which is backwards and downwards. Those on the legs are wider and of a bolder character than the rest, and in both patterns are principally confined to the upper part of the limbs.

Pattern 2.—In this arrangement of hues, which is the commoner of the two, the relation of the two shades to each other is

reversed, the general rule here being, for the greater part of the surface of the fur, light markings on a darker ground, disposed, with the exception of those on the face, legs, and chest, in a manner totally different to that already described. There is, so far as I am aware, no distinctive name for this arrangement of colours, but it might for want of a better, and to distinguish it from the other kind of tabby, be called the "ring-tabby," from the invariable presence of a large ring of the lighter of the two shades, more or less perfect, situated on the side of the body, a little in front of the flank, the dark space enclosed by it containing in most cases yet another light mark near the centre, varying in form and distinctness in different individuals. This ring is partly encircled above and behind by another light-coloured mark, somewhat in the manner of the rings surrounding the bull's-eye of a target. This mark is very wide behind, becoming gradually narrower as it extends forwards, which is only for a few inches, the upper edge being often jagged; its shape serves to harmonize the curve of the upper part of the ring with the two straight, light-coloured lines which invariably extend along the back, over the loins, one on each side of the spine, from the root of the tail to a point between the shoulder-blades, where they suddenly diverge, and again nearly meeting run parallel to each other till they become merged in the light tint of the nape of the neck, which may here be said to form the ground colour; for although the greater part of the body is dark with light markings, the head and neck, chest, and lower half of the limbs, would be better described as having a light ground with dark markings, which scarcely differ from those in pattern 1. The shoulder-markings are often rather obscure, and it is almost impossible to give a good idea of them in writing, but there is a general tendency to follow the direction of the scapulars, and at the same time to harmonize and fit in, so to speak, with the rest of the markings in a beautiful but very subtle manner.

The lines running along the back of the neck in cats of both patterns are five in number (two or more of them often running into each other for a part of their length), the two outer lines in the case of the ring-tabby being continued backwards in a sweeping curve, so as to lead gradually into the dark bands which traverse the chest, enclosing a large space at the side of the head and neck, almost without markings; this is bounded below by a broad

dark patch from which spring the stripes of the chest, only one of which is usually entire. As before stated, these markings are slightly varied and modified in different animals, and no two cats will be found exactly alike; some of the markings in one example will be found to be only faintly or imperfectly indicated, or perhaps entirely suppressed; while in another specimen the corresponding markings will be perfectly developed, and others which were perfect in the first example will be somewhat altered in form, or nearly wanting. The ring, however modified, I have never found entirely absent, nor the two broad stripes over the loins, though they may nevertheless be so occasionally.

From the foregoing very imperfect description of the two distinct manners in which the markings of cats are disposed it will be observed that it is the back and sides which differ most. The most characteristic points which distinguish pattern 1, or the tiger-striped variety, consist in the fact of the light tint forming the ground colour, and the dark the spots and stripes, and in the vertical direction of the side-stripes; that of pattern 2, or the ring-tabby, in the relation of the two tints to each other being reversed, and the dark consequently forming the ground, in the presence of the ring on the side, and of the two broad light stripes on the back, leaving a dark space between. Other well-marked distinctions might be enumerated, but the above will, I think, be sufficient for the present purpose. In the case of cats marked with white, however small the coloured patches may be, the markings upon them will be found to correspond exactly with those of whole-coloured animals, provided, of course, that the coloured parts are large enough to show the pattern, the effect of the white being precisely that of a piece of paper with holes cut in it of various shapes, placed over the animal, through which bits of the pattern are visible. The distribution of white in cats is much the same as in dogs (more especially mongrels): where only a very minute portion of white occurs, it is most likely to be found on the chest; if a rather larger quantity, on the chest and feet; where there is yet more white, more or less of the muzzle is marked with it, accompanied perhaps by a white collar; and so on till we come to white cats with a few dark—that is, tabby—spots. Sandy or red tabby cats are to be found marked according to both patterns.

The distribution of colour in tortoiseshell and white cats

is very singular; instead of the yellow and black forming the two tints for the ground colour and stripes respectively (which arrangement would be very beautiful if it could be produced), the pattern, whichever it may happen to be, is most distinctly seen in the sandy or yellow parts, which are of the same two shades as in ordinary sandy cats—*viz.*, buff and dull orange, interrupted here and there by white. Whether the pattern of the black is a continuation of, and corresponds with, that of the sandy parts, I have never been able to determine; for in many specimens the colours are so mixed up, and disposed in such small blotches, that it is a difficult matter to decide this point. I think it probable, however, that there is but one pattern throughout.

Since hybrids have undoubtedly been produced with the Wild Cat in a state of captivity (see Zool. 1873, p. 3575), is it not within the bounds of possibility that even in a wild state such a thing may occasionally have happened, when the Wild Cat was comparatively common, and thus have given rise to the tiger-striped race? But even then it seems strange that, after countless generations, these two distinct types should continue to be perpetuated, especially as there has never been any attempt worth mentioning at selection as to colour and markings, but all have been allowed to mix indiscriminately, with scarcely any restraint. In Mr. Harvie Brown's interesting account of the rarer animals of Scotland, it is deplorable to read of the gradual extinction of the Wild Cat and the Marten, and their continued persecution by gamekeepers; but as he states that the large deer-forests in the North afford a refuge to a few, and that at least one large landed proprietor affords them protection (would there were more), it may be hoped that the time when this interesting animal can only be considered as a thing of the past is not yet quite at hand.

EXPLANATION OF PLATE I.

- Fig. 1. Tiger-striped Tabby, or Pattern 1.
Figs. 2 & 3. Ring-Tabby, or Pattern 2.
-

NOTES AND OBSERVATIONS ON BRITISH
STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 307.)

Genus *PISA*, Leach.

Perhaps no other genus of the British Podophthalmia is of such interest, or presents such remarkable features in its life-history, as the genus *Pisa*. It comprises two very characteristic species hitherto known from our seas, but is more fully represented in warmer latitudes, where, in all probability, numbers of still undescribed species exist. In the Adriatic Sea alone, according to Prof. Luigi Stalio,* six species are described.

The general form of the carapace of *Pisa* is triangular, the anterior angle being finished by a stout bifid rostrum, varying slightly in the two species. Its appearance is spinous, and the legs are shorter in comparison with the body than those of the other "Spider Crabs." The antennæ are about as long as the rostrum, the second joint being slender. The external pedipalps are broad, and the abdomen is seven-jointed in both sexes. As the specific characteristics are, although so closely allied, yet so distinct, it is perhaps more advantageous to simply sketch the generic features rather than to attempt details which are subject to variation. For instance, the club-shaped hairs of the antennæ alluded to by Bell can scarcely be said to refer equally to both species, seeing that the general covering of the carapace is so extremely dissimilar in the two; and, in fact, his two figures† represent antennæ of considerably different structure as to this hairy covering.

Pisa tetraodon, Leach.

The carapace of this species is about an inch and a half long in the adult, although specimens occasionally occur in which this length is exceeded. The greatest breadth is about an inch. Although roughly triangular, its form is much more rounded than

* 'Atti del Reale Istituto Veneto,' Tom. iii., ser. 5, p. 375.

† 'British Stalk-eyed Crustacea,' pp. 22 and 27.

that of the following species; its lateral margin is armed with stout spines, of which two large ones protect the eye-stalks, and two others, still larger, form the bifid rostrum.

The carapace is ornamented with spines and tubercles, interspersed with tufts of a remarkable hair-like process, which we will allude to more fully in the description of *Pisa Gibbsii*. These tufts afford lodgment to the spores of marine life, so that it is not unusual to find specimens of *P. tetraodon* to which are attached zoophytes, such as *Plumularia falcata*, *Alcyonium digitatum*, and others; also sponges, such as *Halichondria panicea*, but as the following species is much more liable to this remarkable embellishment, we will describe individual specimens when dealing with *P. Gibbsii*.

The legs of *Pisa tetraodon* are stout and armed with hairy tubercles. They taper off after the first joint and are furnished with extremely sharp curved claws, which are capable of being clenched back upon the next joint, so that the hold of the animal is rendered very secure; in fact, its habits in this respect correspond to those of many parasites which live on the hair of animals, and require a firm mode of attachment. This similarity of development is of considerable interest, and when we consider that the habits of this genus are extremely retiring and sedentary, this means of a secure anchorage is accounted for.

The anterior pair of legs are as usual developed, in the male, into a formidable pair of forceps. Bell observes that these legs do not attain to this size until the animal is adult, so that males which are nearly full grown may have them equal in size to the anterior pair of the female. In fact, specimens are sometimes met with which have these legs fully developed, and yet are of smaller size than others whose corresponding limbs are quite immature.

The abdominal somites are seven in number, narrow in the males, but so broad in the female as to be almost circular, and thus capable of affording protection to a large mass of ova. The somites are divided vertically by a broad ridge or keel, with a small tubercle on each somite.

The antennæ in this species are studded with clubbed hairs; the external pedipalps are broad, and the eyes, which are very little broader than their peduncle, are capable of being turned back for protection into their orbit.

The colour of *P. tetraodon* varies considerably, some that we obtained from the Sussex coast being of a dirty brown and liable to obscuration by the growth of Algæ, &c., whilst amongst those which we obtained from the Channel Islands were many of a rich reddish brown tint, remarkably clean and fresh-looking. As we received these specimens alive, we know the colour was not caused by any exposure of the shell to undue heat, but was perfectly natural. From further observations we are inclined to believe that specimens vary considerably in colour, according to the geological character of the district, which affects to some extent not only the nature of the sea-bed which forms their home, but also the marine fauna and flora by which they are surrounded.

The ova of this species are very numerous and of a rich orange colour, attached in the usual way to the swimmerets of the female, and covered by the broad segments of the abdomen. They are exuded during April and May, and become a deep red, approaching to black as zoeæ matures.

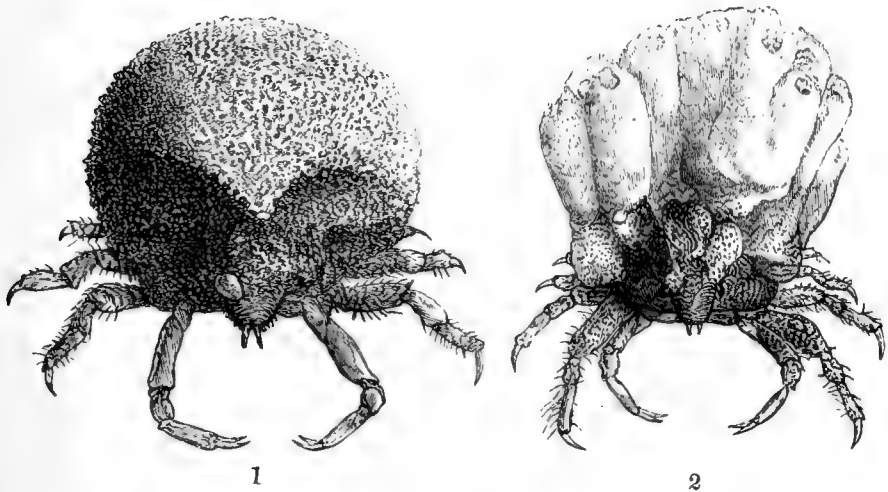
Pisa tetraodon is considered by Bell as "not common"; but although it may not be widely distributed it is certainly very abundant where it occurs, and we have obtained it from several localities in tolerable numbers; as, for instance, the Nore, the Channel (Sussex coast), and the Channel Islands. Dr. Leach mentions "the Isle of Wight, Teignmouth, and Brighton," and Bell "the Dorsetshire coast and Bognor." M. Milne-Edwards says it is very common on the shores of France and England. Mr. Lovett found large numbers of bleached and broken specimens on the beach at Shoreham in May, 1880, and quantities were thrown up in the same locality during the great storm of January, 1881.

Pisa Gibbsii, Leach.

Although this species resembles the former in many of its general features, it differs from it widely in others. The form of the carapace is more flattened, also less rounded laterally; its margin is also less spinous, and its rostrum not so divergent at the extremity, though somewhat longer than that of *P. tetraodon*.

Perhaps, however, its chief peculiarity, and at the same time one of the most remarkable features in the whole of the *Decapoda*, is the existence in *Pisa Gibbsii* of the dense covering of "hair"

which it possesses. The direct use of this peculiar covering appears somewhat doubtful, but its suitability to form a nidus for the growth of forms which tend to conceal the animal probably afford the true explanation. The "hairs" when examined microscopically consist apparently of a fibrous mass distributed very equally over the carapace and of an equal height. Upon the tubercles of the carapace, however, there are tufts of hair of a different structure; these latter are not fibrous, and are, moreover, club-shaped and curved, resembling in form the antennæ of the lepidopterous insect, *Zygæna filipendula*. If a vertical section be taken through the carapace, the hairy covering will appear like a multitude of pillars supporting a platform; this platform is formed



SPECIMENS OF *PISA GIBBSII* WITH SPONGES ATTACHED.
(See p. 363.)

by the ends of the fibres becoming matted together with objects with which they come in contact and to which they readily adhere. Amongst those on the stage of our microscope were many grains of sand and large quantities of spiculæ, &c. All this accumulation affords an excellent lodgment for the spores of various marine growths, and we shall close our account of this species with a description of a few of the most remarkable of these in Mr. Carrington's collection. The hair-like processes on the sternum are on a whitish ground, which gives a curious effect, the hairs being brown. When dry they are easily broken away and show

little or no attachment to the surface of the exoskeleton of the animal.

The generic peculiarity already alluded to—namely, its sluggish habits—are well illustrated in this species; and it is partly owing to the sedentary habits of the female in particular that the spores, &c., of marine animals are enabled to become planted in this villous covering. Mr. Carrington's assistant, Edward Matthews, recently made some observations upon some specimens of this species which were living in one of the tanks at the Royal Aquarium, Westminster, and he noticed that one remained perfectly motionless between two little ledges of rock for two or three days. Thinking it was dead, he was about to remove it, but, finding it to be perfectly lively and well, he returned it to the water, whereupon it took up its former position, in which it was seen altogether for upwards of a week. This is a striking instance of the stationary habits of some of the Crustacea, and it is therefore not so much a matter of surprise that they become, in the way they do, so assimilated in appearance to their surroundings.

Many of the specimens of this species that have come before our notice have been so completely buried in masses of sponge and *Alcyonium* that it seems more than probable that their protective covering ultimately destroys them. Thus that which preserves their life by protecting them from the attacks of natural enemies, who evidently do not recognise them under their spongy covering, eventually causes their death. In one specimen which we saw, only one leg and the abdominal segments were left free, and the eyes were just able to move in a deep hole in the sponge, which proved to be of the genus *Ophlitaspongia*.

In course of time, no doubt, *Pisa Gibbsii* thus becomes the nucleus of a mass of silicious spiculæ which envelop and preserve the form of the crab. Were there any representatives of this peculiar type existing in the cretaceous seas, doubtless we should meet with their silicified tests in the flints of that formation. We are not aware of the existence of any allied form having hitherto been found in any rocks. We are, however, enabled to form some sort of idea as to the manner in which certain bodies may have become enveloped in masses of silicious spiculæ, and ultimately to have become the nucleus of a flint nodule.

Pisa Gibbsii was, according to Dr. Leach, discovered by Gibbs, who was employed as a collector by Colonel Montagu. It is apparently not rare on the south coast in depths of from five to twenty fathoms, and has been recorded from Devon, Cornwall, Brighton, and Hastings. Prof. Milne-Edwards gives its localities as the shores of France and England. We have obtained it principally from mid-channel, whence it was obtained by dredging. We also obtained some from the Channel Islands, amongst which were two beautiful varieties, both males, the colour of which was a rich carmine, the brightness of which did not entirely disappear at death.

The usual colour of this species is a russet-brown, varying occasionally in shade. It is stated to be with ova in December.

The following is a short description of six specimens of *Pisa Gibbsii* in Mr. Carrington's cabinet:—

No. 1.—This specimen is figured at p. 361, and is covered with a rounded growth of the sponge *Dysidea fragilis*. This sponge had almost completely enveloped the animal, and illustrates our previous observation as to the ultimate destruction of the enclosed crustacean, as there is every probability that this identical specimen would have at length become helplessly covered by the external growth. This sponge is extremely brittle when dry, and comparatively so when living, being composed to a large extent of sand.

No. 2.—This specimen, also figured at p. 361, is the most beautiful of the series. It carries on its carapace a rare sponge, *Isodictya*, which is attached by its base across the carapace from one side to the other, as shown in the figure. It rises to a height of about an inch and a half, and is about half an inch thick. Its colour is a most delicate glossy white, and when the crab reached us alive, with its burden in a fresh condition, it was a most lovely object, the contrast of colour having a most striking effect.

No. 3.—This specimen carries a large sponge, *Desmacidon rotalis*, which is one of our rare forms. This sponge is massive, sessile, and uneven or ragged, and of a dark warm-brown colour; it completely covers the upper carapace, and rises to a height of an inch and a half from its base. The eye-stalks of the crab are free, as their motion prevents the growth of the sponge upon them.

No. 4.—This crab is quite obscured by a very fine growth of sponge, *Isodictya dichotoma*, which rises and spreads from the carapace of the animal so as to completely shield it from view. Interspersed with this sponge there is a growth of the zoophyte, *Plumularia falcata*, the fronds of which are about two inches in length. Altogether this specimen is a fine example of protection obtained by resemblance to the ordinary rock-growth of the seabed, and it is only necessary for the crab to tuck in its legs and remain still to appear like the surrounding objects in its neighbourhood.

No. 5.—This example consists of an irregular growth of a species of *Isodictya*, intermingled with some fine tufts of *Sertularia argentea*. In this specimen there is a pebble of limestone half an inch in diameter embedded in the sponge.

No. 6.—This animal is a highly interesting specimen, owing to the number of parasitic growths which have secured a lodgment upon it. The whole of the upper carapace is covered with a dense mass of sponge, *Halichondria panicea*, which extends in an elongated branch for nearly an inch beyond the rostrum; its height is, however, only about half an inch. Over about two-thirds of the surface of this sponge is growing a second, *Dysidea fragilis*, its arenaceous net-work forming a beautiful object. At the termination of this mass there is a tuft of *Sertularia argentea*, and upon the right lateral margin of the carapace, immediately beneath the overhanging edges of the two sponges, is an *Alcyonium digitatum*, about half an inch long and three-eighths of an inch broad; beside this, again, is a tube of *Serpula communis*. Altogether it is a matter for surprise that an animal so obstructed and weighted is able to perform its ordinary life-functions, and it would certainly be a logical conclusion to arrive at, that *Pisa Gibbsii* is a species in the process of becoming extinct, notwithstanding its comparative immunity from attacks by fishes.

(To be continued.)

ON EUROPEAN BIRDS OBSERVED IN NORTH AMERICA.

BY PERCY E. FREKE.

IN the following pages I have endeavoured to bring together the various scattered records of European birds which have occurred in North America, and which are, properly speaking, not natives of that continent. I have treated as "European birds" all species which are found in Europe, either as natives or as accidental stragglers from neighbouring countries. It is not without much hesitation that I have included these accidental stragglers, but the difficulty of determining which should be considered natives and which foreigners has decided me on including them all, distinguishing by an asterisk those species which Mr. Dresser has excluded from his list of the Birds of Europe.

Unfortunately the difficulty of determining which might fairly be considered as extralimital to the Nearctic region was not so easily solved. On referring to Mr. Ridgway's list in the 'Bulletin of the United States National Museum' for 1881, I find under this designation such species as *Saxicola œnanthe* and *Motacilla flava*, which are known to breed in North America, and which I could not therefore include here. I have therefore omitted from the list the following species, which are sometimes classed as extralimital, as I consider that they properly belong to the North American fauna:—

Saxicola œnanthe.—Breeds in Greenland, Labrador, &c.

Motacilla flava.—Alaska.

Linota hornemanni.—Greenland.

Haliaëtus albicilla.—Greenland.

Anser albifrons.—Greenland.

Ægialitis hiaticula.—Greenland, and west of Cumberland Gulf.

Tringa alpina.—Probably in Greenland, and certainly on the Melville peninsula and elsewhere in Davis' Straits.

The occurrence of *Phaethon æthereus*† in Norway, as reported by MM. Degland and Gerbe, in their 'Ornithologie Européenne' (vol. ii. p. 363), must be considered more than doubtful, and I have omitted it; though it must not be forgotten that Leigh, in his 'Natural History of Lancashire, Cheshire, and the Peak,'

* Once observed in the Nearctic region.

published in 1630, described and figured a "Tropical Bird" which was obtained in England more than 250 years ago, and was in all probability of this species; and Naumann ('Rhea,' i. p. 25) recorded the occurrence of a bird of the genus at Heligoland in or before 1846.

Cygnus bewicki is given by Swainson and Richardson (Faun. Bor. Am., part ii., 1831, p. 465) as breeding in North America upon the sea coast within the Arctic circle, and wintering—according to Lewis and Clarke—near the mouth of the Columbia river. The birds referred to were probably only small specimens of what is now known as *C. americanus*, which was only recognised as a species (Sharpless-Doughty's Cat. N. H., 1830) the year before the date of the 'Fauna Boreali Americana.' Mr. Ridgway, however, considers the evidence sufficient to warrant him in retaining *C. bewicki* on the American list (Bull. U.S. Nat. Museum, 1881, No. 587).

In this paper will be found several species which have only occurred in North America on the Pacific coast, and which could by no possibility be supposed to have crossed over from Europe, but have probably come from the eastern side of the Palæarctic region, except the last two in the following list, which are birds of the ocean. They are—

- | | |
|---------------------------------|-------------------------------------|
| 1. <i>Charadrius fulvus</i> | 6. <i>Ægialitis curonicus</i> |
| 2. <i>Parus cinctus</i> | 7. <i>Cyanécula suecica</i> |
| 3. <i>Phylloscopus borealis</i> | 8. <i>Larus cachinnans</i> |
| 4. <i>Syrnium lapponicum</i> | 9. <i>Daption capensis</i> |
| 5. <i>Surnia ulula</i> . | 10. <i>Diomedea chlororhyncha</i> . |

As, however, these ten species belong to the European list, I have retained them here.

Daption capensis I have included on the strength of Degland and Gerbe's record that a bird of this species was shot near Hyères, on the Mediterranean coast of France, in October, 1844. M. de Draguignan, who was its first possessor, gave it to the Natural History collection of Marseilles, where it is stated to be still preserved. They also mention the capture of two other specimens about 1825 (c.f. M. J. Verreaux) on the Seine near Bercy ('Ornithologie Européenne,' vol. ii. p. 373).

The same authors, in treating of *Diomedea chlororhyncha*, state that, according to a note of M. E. Esmark in the 'Nyt. Magazin

for Naturvidensk.' 1838, two specimens of this species were killed near Kongsberg, in Norway, in April, 1837; and the editors of the 'Analyst,' Messrs. Hall and Neville Wood state (vi. p. 160) that one was killed on the Trent, near Gainsborough, in November, 1836.

Of those species which I have retained, some will, I believe, eventually be found breeding regularly in North America, and will be included in its fauna.

The total number of species which I have included in this paper is fifty-six. Nine of these I have regarded as artificially introduced, and although I consider that as European birds in North America they are entitled to a place here, yet I have distinguished them by a different type from those which have probably wandered to America of their own accord.

Of the remaining forty-seven species ten have appeared on the Pacific coast only, leaving thirty-seven as the number that may be regarded as having probably come from the European side of the Atlantic, whereas Mr. Dalglish has been able to report sixty-seven species of American visitors to Europe in a note to his paper on that subject (Bull. Nutt. Orn. Club, January, 1881, vol. vi. p. 64).

If we divide the forty-seven species which have wandered to North America into the convenient arrangement of Land Birds, Waders, and Swimmers, we find them distributed in the following manner:—

	Total number of species.	Eastern United States.	North only.	Greenland only.	Pacific coast only.
Land Birds	13	1	12	6	5
Waders .	17	5	10	8	1
Swimmers .	17	6	9	6	3
	<hr/> 47	<hr/> 12	<hr/> 31	<hr/> 20	<hr/> 9

Including one Wader in Nova Scotia and one Swimmer in Barbadoes.

It will be seen from the foregoing table that of the thirteen species of land birds that have been found on the continent twelve have occurred in the northern part only (*i. e.*, Greenland, Labrador, Alaska, &c.), and the single species which is reported from the United States (*Buteo vulgaris* from Michigan) is rather a doubtful record.

The following is a list of species which have from time to time been recorded as occurring in North America, but which records are now considered *erroneous*:—

Alauda calandra (Linn.), Swainson and Richardson, Faun. Bor. Am. (Birds), p. 244. A specimen was stated to be in the British Museum from Hudson's Bay (!), but my friend Mr. Sharpe tells me that he knows nothing of it. It has been reported by Wilson as American on the faith of a dealer.

Strix aluco (Linn.), Nuttall, Manual, i. p. 135. Newfoundland and Hudson's Bay.

Strix passerina (Linn.), Audubon, Birds of Am., i. p. 116. Picton, Nova Scotia.

Tringa platyrhyncha (Temm.), Nuttall, Manual, ii. p. 114. Arctic America, *vide* Temminck and Bonaparte.

Tringa minuta (Linn.), Swainson and Richardson, Faun. Bor. Am., ii. p. 385. Abundant on flats at the mouth of Nelson and Hayes river. Specimen from Hudson's Bay in the British Museum.

Tringa temmincki (Leisl.), Nuttall, Manual, ii. p. 119. Arctic America.

Totanus calidris (Linn.), Swainson and Richardson, Faun. Bor. Am. Hudson's Bay.

Anser segetum (Gmel.), Nuttall, Manual, ii. p. 348. Canada and Hudson's Bay.

Edemia nigra (Linn.), Nuttall, *l. c.* p. 423. Coast of the United States.

Mergus albellus (Linn.), Wilson, Am. Orn., iii. pl. lxxi. fig. 4. New England and New York. Nuttall, Manual, ii. p. 467. Audubon, Orn. Biog., iv. p. 350; Birds of Am., vi., 1843, p. 408, pl. 114. Lake Barataria, near New Orleans.

Phalacrocorax graculus (Linn.), Nuttall, Manual, ii. p. 484. South Greenland; United States in winter.

Phalacrocorax pygmaeus (Pall.), Nuttall, *l. c.*, p. 487. Northern North America, *vide* Bonaparte.

Phalacrocorax africanus (Gmel.), Nuttall, *l. c.*, p. 488. United States, *vide* Audubon.

Larus fuscus (Linn.), Nuttall, *l. c.*, p. 302. Greenland, Newfoundland, and Hudson's Bay.

Larus marinus (Pall.), Swainson and Richardson, Faun. Bor. Am., ii. p. 426. A specimen taken in Sir J. Franklin's first Expedition. Nuttall, Manual, ii. p. 289. Baird, Cassin, and Lawrence, Birds of N. Am., p. 853, where it is given with a query. Baird, Cat. 1859, No. 671.

Diomedea exulans (Linn.), Nuttall, Manual, ii. p. 340. Coast of United States. Baird, Cassin, and Lawrence, Birds of N. Am., p. 821.

Podiceps cristatus (Linn.), Swainson and Richardson, Faun. Bor. Am., ii., 1831, p. 410, where a description is given of a specimen killed on the

Saskatchewan. Nuttall, Manual, ii. p. 250. Atlantic States from Nova Scotia southward; Texas in winter; fur countries on Pacific side, Washington Territory. Baird, Cassin, and Lawrence, Birds of N. Am., p. 893; Baird, Cat. 1859, No. 703.

Podiceps minor (Linn.), Nuttall, Manual, ii. 257. Hudson's Bay.

We come then to those species of European birds, which I consider have good claims to be regarded as occasional visitors to North America.

1. *Turdus iliacus* (Linn.), Redwing.—One was sent from Greenland to Dr. Paulsen in 1845. One was shot at Fredericks-haab, South Greenland, October 20th, 1845 (Reinhardt, 'Ibis,' 1861).

2. *Cyanecula suecica* (Linn.), Blue-throated Warbler.—Seven were seen and one obtained June 5, 1851, at St. Michael's, Alaska (Adams, 'Ibis,' 1878, p. 422).

3. *Phylloscopus borealis* (Blas.), Eversmann's Warbler.—One was obtained by Mr. Pease at St. Michael's Island, Norton Sound, Alaska, Aug. 16th, 1866 (Baird, Trans. Chicago Acad., 1869, i. p. 313; Baird, Brewer and Ridgway, Hist. N. Am. Birds, vol. i. p. 71).

4. *Parus cinctus* (Bodd.), Scandinavian Tit.—Several specimens were obtained March 15, 1875, by Mr. L. M. Turner, at St. Michael's, Alaska, where it was found to be not rare (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 37).

5. *Motacilla alba* (Linn.), White Wagtail.—One was sent from the Southern Inspectorate of Greenland in 1849 (Reinhardt, 'Ibis,' 1861). One was obtained at Godhavn, North Greenland, by Dr. Walker, in July, 1857 (Walker, 'Ibis,' 1860); but I do not see this species mentioned in Dr. Walker's list, which was published in the Journ. Roy. Dubl. Soc., vol. iii., 1860, p. 61; where, however, he says, "I shall only enumerate *some* of the different species," &c.

6. *Anthus pratensis* (Linn.), Titlark.—One was sent to Dr. Paulsen from Greenland in the autumn of 1844 (Reinhardt, *in lit.*). 1845 is the date given in Prof. Reinhardt's paper in the 'Ibis' of 1861. One was obtained by Mr. W. H. Dall at St. Michael's, Alaska, and is now in the collection of the United States National Museum (Baird, Brewer, and Ridgway, Hist. N. Am. B., vol. i., p. 173).

[*Carduelis elegans* (Steph.), Goldfinch.—Commonly imported as a cage-bird, and specimens, which have probably escaped from confinement, have not unfrequently been taken in Massachusetts (J. A. Allen, Bull. Nutt. Orn. Club, vol. v. p. 120). Mr. Allen saw one at Cambridge, Massachusetts, Feb. 28, 1865 (J. A. Allen, Am. Nat., vol. iii., p. 635). It has occurred near Boston, Massachusetts (Brewer, Proc. Bost. Soc. N. Hist., xx., 1879, p. 271).]

[*Serinus meridionalis* (Brehm.), Serin Finch.—One was taken at Springfield, Massachusetts, in November (J. A. Allen, Am. Nat., iii., p. 635).]

[*Ligurinus chloris* (Linn.), Greenfinch.—A male of this species was taken March 19th, 1878, at Lowville, Lewis County, New York (R. B. Hough, Bull. Nutt. Orn. Club, vol. v., p. 119). This was also probably an escaped bird.]

[*Passer domesticus* (Linn.), House Sparrow.—First introduced into North America at Portland, Maine, in 1858 (Baird, Brewer, and Ridgway, Hist. N. Am. B., vol. i. p. 526). It has overrun the entire eastern province from the Atlantic coast to the Missouri, and south nearly or quite to the Gulf, but it is most abundant in the Northern States. It is equally abundant in the Missouri Valley and in the Atlantic States, but is, of course, more so in some localities than in others. Apparently not yet introduced into California or other parts of the West (Ridgway, *in lit.*). In the vicinity of all the larger cities, *Passer domesticus* far outnumbers all the native birds taken collectively. It is common also at Salt Lake City, Utah, and at St. Louis, Missouri (Allen, *in lit.*). I have found it abundant in all the cities of the East, from Montreal, Canada, to Richmond, Virginia; but it does not seem to spread much into the surrounding country. Said to have been established in the Bahama Islands, but Mr. Corry says that he has not seen it there ('Birds of the Bahama Islands,' p. 89).]

[*Passer montanus* (Linn.), Tree Sparrow.—Naturalised at St. Louis, Missouri, previous to the introduction there of *P. domesticus*, an interesting account of which is given by Mr. Widman (Bull. Nutt. Orn. Club, vol. v. p. 191). As yet reported only from the immediate vicinity of St. Louis (Ridgway and Allen, *in lit.*).]

[*Alanda arvensis* (Linn.), Sky Lark.—Introduced and apparently established in several localities, as on Long Island, and the vicinity of Cincinnati (Ridgway, *in lit.*). One was shot, June 12, 1850, on the north shore of of Hamilton, Bermuda, by Mr. Hurdiss (Jones, 'Naturalist in Bermuda,' p. 30). Probably this was an escaped bird. *Note.*—Mr. Dresser, in his 'Birds of Europe,' says it occasionally visits Greenland, but Professor Reinhardt tells me, "I never heard of any instance at all, and I do not know on what authority the bird is said to be an 'occasional visitor. I suppose an error.'"]

7. *Sturnus vulgaris* (Linn.), Starling.—One was sent from Greenland by Hølboll to the Royal Museum, Copenhagen in 1851 (Reinhardt, 'Ibis,' 1861).

[*Corvus frugilegus* (Linn.), Rook.—Mr. Ridgway saw a specimen of this bird, apparently lately escaped from confinement, perched on a maple tree in the grounds of the Agricultural Department at Washington, D.C., in August, 1879 (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 84).]

8. *Syrnium lapponicum* (Rets.), Lapp Owl.—One was taken at the Yukon delta, Alaska, April 15, 1876, by Mr. L. M. Turner (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 37).

9. *Surnia ulula* (Linn.), Hawk Owl.—Obtained by Mr. Turner at St. Michael's, Alaska, in October, 1876 (Ridgway, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 38).

10. *Buteo vulgaris* (Leach), Buzzard.—One is said to have been taken at Pau Pau, Michigan, by Mr. J. D. Allen, about the beginning of October, 1873 (J. C. Maynard, Bull. Nutt. Orn. Club, vol. i., 1876, p. 2; Ridgway, *l. c.*, p. 32).

11. *Falco gyrfalco* (Linn.), Jerfalcon.—With regard to specimens which might be considered European examples of this bird or its variety *islandus* occurring in North America, I can find no satisfactory evidence. Mr. Ridgway informs me that "no reference can be relied on, all records of *islandus* from the U. S. applying to either *sacer*[†] or the dark Labrador form *obsoletus*, Gm. I have seen Arctic specimens, however, that could not be distinguished from Iceland specimens; also others that can be perfectly matched by Scandinavian skins (true *gyrfalco*). In fact, 'sacer' is a form intermediate between *gyrfalco* and *islandus*, some examples being indistinguishable" (Ridgway, *in lit.*). Prof. Reinhardt includes the Iceland form in his list of Greenland birds ('Ibis,' 1861).

12. *Falco æsalon* (Tunstall), Merlin.—A specimen was caught at sea near Greenland, lat. 57° 41' N., long. 35° 23' W., in May, 1867, by Mr. E. Whymper, and presented by him to the Norfolk and Norwich Museum (Newton, Man. Instr. Arct. Exp., 1875, p. 96).

† Mr. Ridgway here refers, not to *Falco sacer* (Gmel.), the Saker Falcon of the Old World, but to a variety of *F. gyrfalco*, which he calls *Hierofalco gyrfalco sacer* (Forst.), Ridgw.,—McFarlane's Gyrfalcon,—found in the interior of Continental Arctic America.

13. *Falco tinnunculus* (Linn.), Kestrel.—One is said to have flown on board ship, off Cape Farewell, Greenland, on Parry's first return voyage, and been killed (Sabine, Suppl. Appl., p. ccx; Newton, Man. Instr. Arct. Exp., 1875, p. 96).

14. *Ardea cinerea* (Linn.), Heron.—A young bird was found dead near Nenortalic, Greenland, in the year 1856, and was sent to Copenhagen (Reinhardt, 'Ibis,' 1861). On Aug. 27th, 1765, the missionary Matthæus Stach saw a Heron in Greenland, which has been reported as of this species (Cranz, 'Fortsetzung der Historie von Grönland,' p. 214; Reinhardt, 'Ibis,' 1861).

15. *Bernicla leucopsis* (Bechst.), Bernicle Goose.—One was obtained by Mr. B. R. Ross, near Rupert House, James' Bay, Hudson's Bay (Baird, Am. Nat., 1868, p. 49). One was obtained at Currituck Sound, North Carolina, Oct. 31st, 1870 (Lawrence, Am. Nat., vol. v. p. 10; Ruthven Deane, Bull. Nutt. Orn. Club, vol. ii, 1877, p. 18, foot-note). One was killed at Jamaica Bay, Long Island, Oct. 18th, 1876 (Lawrence, Bull. Nutt. Orn. Club, vol. ii., 1877, p. 18). This specimen is now in the U. S. National Museum, No. 80015 (Ridgway, *in lit.*). One is reported from La Salle County, Illinois? ('Forest and Stream,' Nov. 23rd, 1876). According to Hölboll, it is a regular autumn visitor to Julianehaab, Greenland (Reinhardt, 'Ibis,' 1861). Recorded by Graah from the east coast of Greenland (Newton, Man. Instr. Arct. Exp., p. 112).

*[*Chenalopez aegyptiaca* (Gmel.), Egyptian Goose.—One was taken near Carnarsie, Long Island, Jan. 3rd, 1877 (Akhurst, Bull. Nutt. Orn. Club, vol. ii., 1877, p. 52). Although having "every appearance of being a wild bird," this specimen had probably escaped from confinement.]

16. *Cygnus musicus* (Bechst.), Whooper Swan.—According to the Esquimaux it used to breed in Greenland long ago.† Two specimens were sent from South Greenland in 1852, and one was shot at Atamik, ten Danish miles north of Godthaab, June 1st, 1859. Some others were observed at Julianehaab in 1846 (Reinhardt, 'Ibis,' 1861).

17. *Querquedula crecca* (Linn.), Teal.—In his paper on "Birds of New England," published in the Proc. Essex Inst., Dr. Coues says it has been "so often taken on the coast as to be fairly considered as more than an accidental visitor" (Proc. Essex Inst.,

† Were these birds of this species?

vol. v. No. viii., 1867, p. 298). I have, however, been unable to find definite records of more than a few captures of this species in North America, and I believe its occurrence on the coast is very uncommon. Dr. Coues informs me that he has a specimen in his possession taken in Labrador in 1860, and reported by him in his "Notes on the Ornithology of Labrador" (Proc. Philadelphia Acad. 1861). One is reported by Dr. Bryant as having been shot in Massachusetts, and he states that he has seen several in New York (Proc. Boston Soc. Nat. Hist., vol. v. p. 195). For this occurrence in Massachusetts see also Dr. Brewer, in the Bull. Nutt. Orn. Club, vol. ii., 1877, p. 46, where it is stated to have been taken in North Carolina, and not in Massachusetts. An adult male and an adult female, both from New York, are in the collection of the U.S. National Museum (Ridgway, *in lit.*). A few have been taken in Greenland (Reinhardt, 'Ibis,' 1861).

18. *Mareca penelope* (Linn.), Widgeon.—Long Island, N. Y.:—One taken on Long Island was purchased in Fulton Market, New York, in 1842 (De L. Berier, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 190). One, probably from Southampton, Long Island, was purchased in Fulton Market, New York, Jan. 6, 1873 (N. T. Lawrence, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 98). Virginia:—Two specimens seen by Dr. Bryant in Quiney Market (Boston, Mass.) from Virginia. He also exhibited a specimen obtained in the market and brought from Philadelphia, and he stated that he had seen two in New York (Proc. Boston Soc. Nat. Hist., vol. v., p. 195; from report of proceedings held April 18th, 1855). One was taken on the coast of Virginia in 1855, and is in the collection of Mr. G. W. Lawrence (N. T. Lawrence, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 98, where Mr. Lawrence says this capture has not been previously recorded). North Carolina:—One, a male, was taken at Currituck, about Dec. 17th, 1878 (De L. Berier, *l. c.*, vol. iv., 1879, p. 190). One was killed at the same place as the above, Jan. 17th, 1879, and is in the possession of Mr. Wm. Bayles, of Brooklyn (De L. Berier, *l. c.*, vol. iv., 1879, p. 190). One, a male, was shot at Currituck in December, 1879, and one or more is received from this locality every winter (Ruthven Deane, *l. c.*, vol. v., 1880, p. 126). Greenland:—A young male was sent from thence to the Royal Museum, Copenhagen, in 1851, and two others also from South Greenland (Reinhardt, 'Ibis,' 1861). The two birds alluded to above, both young males,

were obtained, one in 1852 and the other in 1853 (Reinhardt, *in lit.*). It is "a rather common species in the Aleutians and other parts of Alaska" (Ridgway, *in lit.*). Found south as far as San Francisco (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 77).

19. *Fuligula rufina* (Pall.), Red-crested Pochard.—There is "a young male from New York Market in the [U.S.] Nat. Mus. Coll., collected in the fall of 1871?, the specimen being a young bird just beginning to assume the adult livery" (Ridgway, *in lit.*).†

20. *Edemia fusca* (Linn.), Velvet Scoter.—"A beautiful male was obtained at Godthaab (South Greenland) in May, 1878, and presented to our Museum" (Reinhardt, *in lit.*; Reinhardt, Vid. Medd. Nat. För. Kjobenhavn, 1879, p. 1).

[*Coturnia communis* (Bonnat.), Quail.—It has been introduced into various localities in the Eastern United States, and now partially naturalized (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 84).]

21. *Porzana maruetta* (Leach), Spotted Crake.—One was obtained near Godthaab, Greenland, Sept. 28th, 1841. One taken at Nenortalik, Greenland, was sent to the Royal Museum, Copenhagen, in 1856 (Reinhardt, 'Ibis,' 1861).

22. *Crex pratensis* (Bechst.), Corn Crake.—It has been taken in New Jersey (Cassin, Proc. Philadelphia Acad., vii., 1855, p. 265; Baird, Am. Jour. Sci. & Arts, 1866, pp. 338, 339). One, an adult male, was taken at Godthaab, Greenland, and sent to the Royal Museum, Copenhagen, in 1851 (Reinhardt, 'Ibis,' 1861). One was shot in Bermuda, Oct. 25th, 1847 (Wedderburn, Zool. 1849, p. 2591).

23. *Fulica atra* (Linn.), Coot.—The Royal Museum, Copenhagen, "received a beautiful specimen from Greenland in 1876" (Reinhardt, *in lit.*).

24. *Charadrius plumialis* (Linn.), Golden Plover.—One was shot on the Noursoak peninsula, in summer plumage, Greenland, in the spring of 1871, and Dr. Finch thinks it may perhaps breed in Greenland (Newton, Man. Instr. Arct. Exp. 1875, p. 100). Dr. Walker states that he obtained it at Godhavn, North Greenland, in July, 1857, and also at Port Kennedy, Bellot Straits, lat. 72° 11' N. long. 94° W. in the winter of 1858-9 ('Ibis,' 1860, p. 166).

† Supposed to have been shot on Long Island Sound (Ridgway, Proc. U.S. Nat. Mus., April 13th, 1881, pp. 22—24; J. A. A., Bull. Nutt. Orn. Club, vol. vi., p. 173).

25. *Charadrius fulvus* (Gmel.), Eastern Golden Plover.—Taken on St. Paul's Island, Prybilov Islands, Alaska, by Mr. H. W. Elliot, May 2nd, 1873 (Elliot's 'Prybilov Islands'; Coues, 'Birds of the North West,' p. 450, foot-note).

26. *Ægialitis cunonica* (Gmel.), Little Ringed Plover.—Described from San Francisco, California, as *Æ. microrhyncha*, Ridgway, N. S. Am. Nat., viii., Feb. 1874, p. 109 (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 67). But Mr. Ridgway added with caution that "it is extremely doubtful whether the specimen was really obtained near San Francisco, as stated on the label."

27. *Vanellus cristatus* (Meyer), Lapwing.—One, a male, was obtained near Fiskensæset, South Greenland, Jan. 7th, 1820, and sent to the Royal Museum, Copenhagen. One was received from Julianehaab, Greenland, in 1847 (Reinhardt, 'Ibis,' 1861).

28. *Hæmatopus ostralegus* (Linn.), Oystercatcher.—Three examples have been sent from Greenland, one of which was from Julianehaab, in 1847, one from Godthaab in 1851,—both in the Royal Museum, Copenhagen,—and one from Nenortalik in 1859 (Reinhardt, 'Ibis,' 1861).

29. *Scolopax rusticola* (Linn.), Woodcock.—It has been taken in Virginia (Coues, Am. Nat., x., June, 1876, p. 272). Two have occurred in New Jersey, and one in Newfoundland (*cf.* Lawrence, Ann. N. Y. Lyc. Nat. Hist., viii. pp. 292, 293; Baird, Am. Jour. Arts and Sci., 1866, pp. 338, 339).

30. *Gallinago media* (Leach), Snipe.—Prof. Reinhardt ('Ibis,' 1861) states that it is not uncommon in Greenland, and perhaps breeds there. He tells me that several specimens have been obtained, one in the autumn of 1845 (Reinhardt, *in lit.*).

31. *Tringa subarquata* (Güld.), Curlew Sandpiper.—Massachusetts:—One at Cape Ann, 1865 (Samuels, Orn. and Oöl. New Engl., 1868, p. 447). One taken at Nahant beach about 1869 (Ruthven Deane, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 124). One at Ipswich, 1875 (Brewer, Proc. Boston Soc. Nat. Hist., xvii. p. 446). One at East Boston, May, 1876 (Brewster, *l. c.*, vol. i., 1876, p. 51). One at Cape Cod, May, 1878 (Ruthven Deane, *l. c.*, vol. iv., 1879, p. 124). Maine:—"Not very plenty" (Broadman, Proc. Boston Soc. N.H., ix., 1862, p. 128). New Jersey:—At Egg Harbour, "occasionally shot" (Turnbull, Birds of E. Penn., 1869, p. 44). Connecticut:—Three distinct records (Merriam, Birds of Conn., 1877, p. 190). Long Island, N. Y.:—Has occurred in

1839 (Merriam, *l. c.*, cf. Dr. Ayres). Said to have been found breeding in Greenland [?] (Brewer, Bull. Nutt. Orn. Club, vol. iv., 1879, p. 190). Professor Reinhardt, however, informs me this is "certainly a mistake, the bird has never been obtained in Greenland," &c. (Reinhardt, *in lit.*).

32. *Machetes pugnax* (Linn.), Ruff. — Massachusetts:—One specimen recorded (Ann. Nat., vol. vi., p. 306). One, a young male, taken at Chatham, Mass., Sept. 11th, 1880 ('Forest and Stream,' Oct. 7th, 1880, p. 186). Maine:—A female taken at Upton, in that State, Sept. 8th, 1874 (Brewer, Bull. Nutt. Orn. Club, vol. i., 1876, p. 19). Dr. Coues, quoting Broadman, mentions one or two occurrences at Calais (Proc. Essex Inst., vol. v., 1867). Long Island, N. Y.:—Accidental (Lawrence, Ann. N. Y. Lyc. N.H.V., 1852, p. 220). Ohio:—A male taken at the Licking Reservoir, about thirty miles east of Columbus (Wheaton, Bull. Nutt. Orn. Club, vol. ii., 1877, p. 83).

33. *Totanus ochropus* (Linn.), Green Sandpiper.—One specimen was received by Mr. Harting, in 1873, in a small collection from Halifax, Nova Scotia (Brewer, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 49).

34. *Totanus glottis* (Linn.), Greenshank.—Audubon obtained three specimens at Sand Key, Florida, May 28th, 1832 (Birds of America, vol. v. p. 321). Inhabits the province of New York [?] (Pennant, 'Arctic Zoology,' vol. ii., Birds, p. 469). Dr. Elliott Coues states (Key, N.A. Birds, p. 259) that "Audubon's specimen is absolutely identical with European ones."

35. *Limosa ægocephala* (Linn.), Black-tailed Godwit.—Fabricius mentions that he had seen a single specimen from Greenland, and since 1820 one is said to have been obtained at Godthaab, South Greenland, and to have been sent to the Royal Museum, but the specimen is not extant (Reinhardt, 'Ibis,' 1861).

36. *Numenius phæopus* (Linn.), Whimbrel.—Prof. Reinhardt says that he has seen five or six specimens, received from all parts of Greenland, and that formerly six others were sent from there (Reinhardt, 'Ibis,' 1861). He tells me there were "perhaps more; it is not very rare" (Reinhardt, *in lit.*).

37. *Hydrochelidon hybrida* (Pall.), Whiskered Tern.—One from the Barbadoes is in the British Museum, presented by Sir Robert Stromberg (Howard Saunders, Proc. Zool. Soc., 1876, p. 641).

38. *Hydrochelidon leucoptera* (Meisn. & Schinz.), White-winged Black Tern.—A specimen was taken in Wisconsin, July 5th, 1873, by Mr. Thure Kumlein, and was erroneously recorded as *H. nigra* by Dr. Coues, in 'Birds of the North West,' 1874, p. 709 (Coues, Bull. Nutt. Orn. Club, vol. iii., 1878, p. 141).

39. *Larus canus* (Linn.), Common Gull.—One was taken by Dr. Coues at Henley Harbour, Labrador, Aug. 21st, 1860 (Howard Saunders, Proc. Zool. Soc., 1878, p. 178).

40. *Larus cachinnans* (Pall.), Yellow-legged Herring Gull.—It has occurred at St. Michael's, Alaska (Baird, Trans. Chicago Acad., i., 1869, p. 305).†

41. *Larus affinis* (Reinh.), Siberian Gull.—Once taken in Greenland (Reinhardt, Vid. Medd. Nat. För. Kjobenhavn, 1853, p. 78). The type specimen.

42. *Puffinus kulhi* (Boie.), Grey Shearwater.—A specimen was received from Greenland by Herr Moschler, and it is now in the Leyden Museum (Schlegel, Mus. Pays-Bas, *Procellariæ*, p. 24). Prof. Reinhardt informs me that he thinks this specimen may have come from Labrador, and not from Greenland.

43. *Puffinus anglorum* (Temm.), Manx Shearwater.—Occurs from the coast of New Jersey to Labrador, and, according to Audubon, is not uncommon off the coast of Maine during summer (Baird, Cassin, and Lawrence, N. Am. Birds). Of not uncommon occurrence off the coast of New England, chiefly in winter (Coues, Proc. Essex Inst., 1867, vol. v., No. viii., p. 304). Seen off the Banks of Newfoundland (Allen, Bull. Nutt. Orn. Club, vol. iv., p. 128). In spite of the above statements, I have been unable to ascertain a single authentic instance of its capture on the coast of the United States, and I believe its right to be included in that fauna is doubtful. It has occurred in Greenland (Reinhardt, 'Ibis,' 1861).

44. **Diomedea chlororhyncha* (Gmel.), Yellow-billed Albatross.—One was taken at the mouth of the Columbia river (Baird, Cassin, and Lawrence, N. Am. Birds, p. 823).

45. **Daption capensis* (Linn.), Cape Pigeon.—Accidental off the coast of California (Ridgway, Bull. U.S. Nat. Mus., 1881, p. 76).

† Mr. W. Couper, of Montreal, informs me that it "breeds commonly on the north shore of the Gulf of St. Lawrence;" but I think he must refer to some other species.

46. *Thalassidroma bulweri* (Jard.), Bulwer's Petrel.—There is a specimen from Greenland in the Leyden Museum, received from the Moravian missionaries (Schlegel, Mus. Pays-Bas, *Procellariidæ*). Prof. Reinhardt informs me that he thinks this specimen may have come from Labrador.

47. *Podiceps auritus* (Linn.), Horned Grebe.—At least three specimens have been received from South Greenland; one from Nenortalik, Nov. 12th, 1828; afterwards two more. (Reinhardt, *in lit.*).

In conclusion, I desire to thank those friends who have helped me in collecting materials for this list. I am especially indebted to the kindness of Mr. Ridgway, of Washington, Mr. Allen, of Cambridge, Mass., Professor Newton, of Cambridge, and Professor Reinhardt, of Copenhagen, who have given me much valuable information and assistance.

THE MOLLUSCA OF THE ISLE OF MAN.

BY THE REV. T. TALBOT.

(President of the Isle of Man Natural History Society.)

A LIST of the Mollusca of the Isle of Man has been prepared with the object of giving approximately complete information of what has been made known to the present time in this department of our insular fauna, and so to suggest a stimulus to further research. It contains the names of 209 species belonging to 103 genera.

This list, which it is proposed to publish in the 'Proceedings' of our Society, is based on Forbes's 'Malacologia Monensis,' a small volume which he published in 1838, and 'The History of the British Mollusca and their Shells,' which he, conjointly with Mr. Hanley, published in four volumes, 1848-1853. The former being of a local, the latter of a general character, it was not to be expected that in this latter work the Isle of Man would be noted as a locality for all the species named in the earlier volume, many of them being of general distribution. Ten years elapsing between the publication of this and the appearance of the first volume of the 'British Mollusca,' this latter work includes several species found in or about the coasts of our island not mentioned in the earlier publication. In the preparation of this list,

therefore, the two works have been carefully compared, and the results are given with a near approach to, if not with absolute, accuracy. I have deemed it well to give an abstract of the two works, so far as they relate to the Mollusca of our island, in parallel columns, devoting two columns to each. As the classification and nomenclature employed in the 'British Mollusca' differ in many points from those of the 'Malacologia Monensis,' and have been much followed by later writers, I have followed them as to the orders, families, genera, and species in this list, those adopted in the earlier work being consequently departed from. For convenience of reference, however, I have added the volume and pages of both works where every species in the list is mentioned.

Several additions to the list of Mollusca have been made since Professor Forbes's time. Mr. Robert Garner, in a paper on "Professor Edward Forbes and his Country," printed in the 'Midland Naturalist' for March and April, 1878, has given, I think, nineteen species as the result of his dredging and other excursions in and about our island. I have inserted these in the list in due order with Mr. Garner's name and his remarks on habitats, &c. Little else is added.

It may be well to call attention to a few of the species claimed for us by Forbes. And first of those of which he says that merely the shell or only a single valve was found. (1) Of the *Pholas cristata* we read in the 'British Mollusca,' "Dead valves are frequently cast ashore on the Isle of Man," and, in the 'Malacologia Monensis,' "Valves are occasionally thrown ashore at Douglas." (2) The *Solecurtus candidus* of the 'British Mollusca' apparently takes the place of the *Solen strigilatus* of the 'Malacologia Monensis,' and in the latter work we are told, "A single valve of the form *b*," i. e., *candida*, "came up in the dredge off the coast of Ballaugh, Sept., 1836." (3) Respecting the *Lutraria elliptica* we read, in the 'Malacologia Monensis,' "Ballaugh (dead valves), Aug., 1837. Port Erin, Mr. Wallace." In the 'British Mollusca' the Isle of Man is given as a locality for this species without further remark. (4) Of the *Cardium aculeatum*, the 'Malacologia Monensis' informs us, "Dead valves sometimes cast on shore at the Point of Ayr, but I have never taken it alive on the Manx coast." And, in the 'British Mollusca,' we read of this species, "It is a remarkably local shell, and we

believed it peculiar to the South Devon coast; it is stated, however, to have been captured also in Dublin Bay and Portmarnock in Ireland, and in the Hebrides and Orkney Islands (Captain Brown), but has evaded all recent researches in those districts. It is rightly a member of the Lusitanian fauna, and extends its range through the Mediterranean, in many parts of which it is as common as it is rare on our coasts." (5) The *Turritella communis* of the 'British Mollusca' is the *Turritella terebra* of the 'Malacologia Monensis,' of which we read, "Frequently cast ashore (though without the animal) on the north coast." (6) The *Natica monilifera* is said, in the 'Malacologia Monensis,' to be "Rare on the Manx shores; south coast at Port Erin;" to which is added the remark, "I have never seen the animal." (7) Of the *Philene aperta* of the 'British Mollusca,' answering to the *Bullea aperta* of the 'Malacologia Monensis,' the habitat given is "In the stomach of a haddock caught off Douglas, Oct., 1837." How far on this evidence (and I am not aware of any other) these seven species can be justly reckoned to belong to the Mollusca of the Isle of Man, I will not decide. Perhaps all do. The evidence, however, suggests search for these particular species in the living state.

All the mollusks above-named were known to malacologists as natives of our British seas before Forbes wrote; but he believed, when he published the 'Malacologia Monensis,' that he had discovered a new British species off the western coast of this island, namely, *Corbula ovata*. He writes against the name in his work, "n. s."; adding, "From the root of a *Fucus* cast ashore at Ballaugh"; he also describes and figures the shell. *Corbula ovata* is given in the 'British Mollusca' also, but regarded as a doubtful native whether of the coast of Man or other coasts of the British Islands. "Although," we read, "the original describer (E. F.) of this shell took it himself from the root of a *Laminaria* cast ashore at Ballaugh, in the Isle of Man, he prefers leaving it among the doubtful species rather than stamp with the authority of mature deliberation the previous introduction into our fauna of a species which by its presence there would violate the probabilities of geographical distribution. About ten years have now elapsed since the date of its publication (1838) during which period no second example has been discovered; should no further specimens then be procured upon our coast, the finding of the only recorded

one must be attributed to some such incident as the imbedding of the living mollusk in the tangled roots of some *Fucus* clinging to the oysters or cirrhipedes so wont to congregate upon ship timber in a foreign port, and the subsequent detachment of the seaweed either in the process of careening, or perchance by the breaking up of the vessel itself." As I believe no other observer since Forbes wrote has found another specimen on our British coasts, I presume that this specimen must be considered as a waif from a foreign shore.

On two undoubted species of our Mollusca I would make a few remarks before closing this paper. One is *Unio margaritifera*. Forbes writes, in the 'Malacologia Monensis,' "In the Black River; common near Braddan Church. It was formerly much sought after by the inhabitants for the sake of the pearls which it not unfrequently contains." In the 'British Mollusca' we read, "The variety *Royssii* of this *Unio* was formerly much sought for in the river near Braddan, in the Isle of Man, on account of its pearl," and, on the following page, "The streams of the Isle of Man." Mr. Garner, in his 'Holiday Excursions of a Naturalist,' p. 72, on mentioning Kirk Braddan, says:—"We searched the little river for a mile or more, for a variety of the pearl-mussel, *Alasmodon Royssii*, mentioned by Mr. Forbes as found here. I only satisfied myself that it existed by picking up a fragment of a valve." Is this once much-prized bivalve extinct in Man, or fast becoming so? I once, some years ago, searched long in vain for a specimen, and I have not heard of anyone since Professor Forbes finding this bivalve. The other species to which I have alluded is the *Orbicula norvegica* of the 'Malacologia Monensis,' and the *Crania anomala* of the 'British Mollusca.' In the latter work it is called a "curious bivalve," as indeed it is, and is stated to have been "added to the British list by Dr. Fleming, who found it adhering to stones, from deep water in Zetland; since then it has been taken abundantly in several localities, chiefly on the west coast of Scotland." In the 'Malacologia Monensis' Forbes says, "A single specimen dredged at Ballaugh, Oct., 1834." The peculiar interest that attaches to this mollusk is owing to the circumstance that it belongs to a family and class which held a much more important position anciently in the population of the seas than it holds now. It is one of the five existing species of the *Craniidæ*, of which thirty-seven species are known in the

fossil state, and which stretches as far back as the age of the Silurian rocks. And it is one of about one hundred existing species of a few families of the *Brachiopoda*, a class of which upwards of 1800 species are known to geologists, and of which by far the greater portion are found in rocks which present to us almost the earliest evidence of life on our planet. I am not aware that any other specimen than that taken by Forbes has been obtained on the coasts of the Isle of Man.

OCCASIONAL NOTES.

CORNISH NAMES OF WILD ANIMALS.—*Apropos* of the note (p. 332) on the former existence of the Bear and Wolf in Cornwall, I give the following list of Cornish names for various wild animals, collected from the Glossaries of Borlase, Polwhele, and others:—Wolf, *Blaidth*; Bear, *Arth*; Fox, *Lawarn*; Wild Boar, *Bora*; Badger, *Brath-kye*; Otter, *Towan*; Wild Cat, *Koitgath* (*i. e.* Wood-cat); Stag, *Caran*; Fallow-deer, *Da*; Buck, *Kidwich*; Roe-deer, *Yorch*; Buck or Goat, *Byk*, *Bocca*, *Boc*; Weasel, *Louennan*, *Codnagwidr* (*i. e.* White-neck); Ferret, *Yengen*; Fitchew, *Milgy*; Hare, *Scovarnoeg* (*i. e.* Long-eared); Rabbit, *Kynin* (Coney). Polwhele says of the Bear (Book i., p. 158) that it continued in the North of England as late as the eighth century; in the South as late as the Conquest.—J. E. HARTING.

RED-DEER FORMERLY IN CO. DONEGAL.—In Thompson's 'Natural History of Ireland' (vol. iv. p. 31), Gough's edition of Camden's 'Britannia' is quoted as authority for the existence of the Red-deer in abundance on the mountains adjacent to Lough Esk, Co. Donegal. This statement is not to be found in the original work of Camden, and is no doubt due to his editor of 1789. From information lately received from my friend the Very Rev. Dean Gwynn, I learn that, when the grandfather of the late Mr. Stewart, of Ards, came to reside there, in 1782, the people there remembered when Red-deer were frequent about Ards. This is a confirmation of Gough's record. In all probability at that period the Red-deer traversed the whole extent of mountain country which lies between these two places, Ards being about thirty-five miles due north of Lough Esk.—H. CHICHESTER HART.

SQUIRREL DESCENDING TO FEED WITH POULTRY.—A neighbour of mine, whose cottage is thickly surrounded with trees, observed a Squirrel, during the severe weather of winter, occasionally stealing food from the troughs set out for the poultry. At first it caused great commotion among the

birds, but latterly they were less uneasy in its presence. Taking an interest in the wild creature, he began to lay out refuse food for it, including bits of ham, which it greedily appropriated. Getting more courageous, it ventured within doors. After a time it got caught in a trap set for rats underneath the bed. Being freed from its irksome position, it was thought that the Squirrel would venture no more within doors. Neither the incident of the trap nor confinement for some time within a cage availed to restore to it its original shyness. With the coming of summer its visits have been less regular, but occasionally it looks in still. May not a habit like this, affecting only one out of many, be looked upon as corresponding to a "sport" in the vegetable world, and shed some light on the subject of the domestication of animals? The Squirrel seems to have been quite a wild one to start with, for there is no one in the district who had been in the habit of keeping one as a pet.—J. SHAW (Dumfriesshire).—*From 'Nature.'*

ARE SEALS BORN BLIND?—To this question I am able to give a very positive answer. On May 23rd, 1868, I purchased of a dealer in Liverpool four adult Seals. One of them proved to be in young, and was consequently placed by herself in a suitable enclosure with a small pond. She soon became quite tame, and fed freely. On June 8th she became restless, and on the following day, about twelve o'clock, she produced a young one, near the edge of the water. It was covered with a rather thick coat of hair, *its eyes very bright and wide open*; it turned and rolled about, divesting itself of the outer covering of hair, which formed a complete mat upon which the young animal lay. For the first hour or two after its birth it was very active, and within three hours after its birth was swimming and diving about in the water like an adult animal. It uttered a low soft "bah," or single call-note, and looked about after its mother and crawled towards her when she came out of the water. The mother would turn upon her side in order to let the young one suck. The young Seal was thirty-two inches long, and weighed twenty pounds at its birth. A notice written by me appeared in the Zoological Society's 'Proceedings,' June, 1868, recording the above facts.—A. D. BARTLETT (Zoological Gardens, Regent's Park).

BIRDS EATING SLUGS.—With reference to the note on birds eating slugs (p. 335), Pheasants certainly do so. I have shot Pheasants in the Holt Forest which have had their crops completely full of a small white slug, and nothing else. But Pheasants are omnivorous. I have killed them in a wild country, far away from arable land, on the borders of Woolmer Forest, with the crop full of the little scale or scab which is found on the under sides of oak-leaves, and with which the ground is sometimes strewed; and again, I once saw a Pheasant shot on Frimley

Ridges, an equally wild country, with the crop a mass of whorts or whortleberries. This was a hen Pheasant, shot in August, mistaken for a Grey Hen, and as she fell the berries bled from her mouth like blood, which attracted our attention to it. I have counted forty-one acorns from the crop of a Pheasant; thirty-nine from a Wood Pigeon. Pheasants also eat the "champignon," as it is called by the country people—a species of fungus.—JOHN W. G. SPICER (Spye Park, Wilts).

RED-WINGED STARLING IN CORNWALL.—I am informed that early in the present month of August a specimen of the Red-winged Starling was shot at the Swanpool, near Falmouth, by Mr. Gill, taxidermist, of that town. My informant states that the bird had been observed in the neighbourhood for nearly a fortnight before it was secured, and that several ineffectual attempts were previously made to shoot it. This appears to be the first time the occurrence of this species has been noted in Cornwall, although it has been met with in several instances in various other counties of England and Scotland. How pleased our lamented friend the late E. H. Rodd would have been at this interesting addition to the avifauna of his county!—J. E. HARTING.

THICK-KNEE ATTACKED BY A HEN.—On the afternoon of August 2nd Mr. Callow, of Northrepps, Norfolk, heard a screaming cry in his stack-yard, and on going thither found that it proceeded from a Thick-knee which was being vigorously attacked and buffeted by a hen that had a brood of chickens in the yard. The Thick-knee allowed Mr. Callow to capture it in his hand, after which its wing was clipped and it was placed in a walled-in garden, where it seems to be doing well. It appears to be an adult bird, and though very thin bears no visible trace of having been wounded. The stack-yard where the Thick-knee was caught is in the neighbourhood of a large heath, and I think that it may have wandered from thence, and have been attacked by the hen under the idea that it was a hawk.—J. H. GURNEY (Northrepps Hall, Norwich).

THE CALL OF THE CUCKOO.—In a letter appearing in 'Nature' (vol. xxii., p. 76), I stated that "All the Cuckoos here intone in a minor key except one, which alone does not flatten the 3rd of the tonic. The key is in all cases precisely D of concert pitch, as proved by a tuning-fork, and the first note is F on the fifth line." This year I find that while the Cuckoos here generally intone in D minor, as above, there is one again that intones in D major, and two others in C major and C. minor respectively. Some that I casually heard in other places in the neighbourhood intoned in D minor.—JOHN BIRMINGHAM (Millbrook, Tuam).—*From 'Nature.'*

ABNORMAL EGGS OF TREE PIPIT.—On May 30th a man brought me a Tree Pipit's nest containing five eggs no larger than those of a Regulus.

The bird was sitting when the man found the nest, though none of the eggs contained any yolk. Dwarf eggs are of frequent occurrence, but I never before heard of a complete nestfull being found. The shells of these are as hard and smooth as those of a full-sized egg, and the colour and markings particularly handsome.—BRYAN HOOK (Farnham).

MONTAGU'S HARRIER IN KIRKCUDBRIGHTSHIRE.—I have lately had an opportunity of examining, in the shop of Mr. Hastings, taxidermist, Dumfries, a female Montagu's Harrier which was trapped on the estate of Cairnsmore, in the first week of June last. From the state of plumage of the under parts, I have little doubt it had been nesting, and Mr. Hastings concurs in this opinion. I am not aware that this species has been previously recorded from the Stewartry of Kirkcudbright.—ROBERT SERVICE (Maxwelltown, Dumfries, N. B.).

ERRATA.—Zool. p. 331, first line, for "fen" read "few"; thirty-fourth line, for "wheat" read "barley."—J. H. GURNEY, JUN.

RARE FISHES ON THE CORNISH COAST.—On August 5th I received a specimen of the Bogue (Couch, 'British Fishes,' vol. i. p. 225). It was taken in a strong tideway in a trammel set in about fifteen to twenty fathoms of water off Mousehole Island, in Mount's Bay. It is the first specimen of this fish which I have ever seen. I have handed it to Mr. Francis Day, who happens to be staying here at present, and he will describe it better than I can. On August 6th a small specimen of the Torpedo, *Torpedo hebetans*, was taken in the Bay here by a trawler. I also took a Dorset, *Asellus varius*, in my trammel the same day.—THOMAS CORNISH (Penzance).

RARE FISHES ON THE CORNISH COAST.—Among the various fishes I have obtained during the past fortnight at Penzance are the following, which may be worth recording:—

The Bogue, *Box vulgaris*. An example 12 inches in length, captured in a trammel on August 5th, was kindly sent me by Mr. Cornish, to whom my best thanks are due for the assistance he has afforded me in investigating Cornish fishes. The previously recorded British examples are three; one at Falmouth, October, 1843; one at Plymouth, June, 1872; and one at Helford Harbour, March, 1873.

Müller's Topknot, *Rhombus punctatus*, 6½ inches in length, captured in a trammel along with some Thick-lipped Grey Mulletts, *Mugil chelo*. When I first saw it the colours were well marked. Its upper surface was of rich chestnut-brown, while a wide black band passed backwards and a little outwards from each eye. Five large rounded black spots were present on the body, and other smaller and irregularly sized ones were irregularly

distributed. Fins brown, with some dark blotches on the dorsal and anal. The fishermen insisted upon its being a young Brill. It would seem to be common in Mount's Bay, Mr. Cornish having obtained forty-eight examples there between 1858 and 1866.

Torpedo, or Cramp-fish, *Torpedo hebetans*. This fish I have reason to believe, is not very uncommon. At the beginning of August Mr. Matthews, while on board of a trawler off Polperro, observed a large one just captured, which the fishermen were about eviscerating (its liver being removed for the oil it contains), and which would have subsequently been thrown overboard. It was saved for my collection. August 6th, one was trawled off Penzance; August 10th, another, in a debilitated condition, was seen making slowly towards the shore in Mount's Bay and secured by means of a boat-hook. During the present month one was taken at St. Ives, and two more have been captured at Mevagissey this season.

Sting Ray, *Trygon pastinaca*. Mr. Cornish has recorded one from Porthcarrow Sands, nine miles from Penzance. On August 10th I received a young example, measuring seven inches across the disc, which had just been taken in Mount's Bay, and about the 1st of the month two more were said to have been secured at St. Ives in a trawler. The Westminster Aquarium, during the last few years, has received several from the south coast, while they are by no means uncommon off the mouth of the Thames.

Along the S.W. coast one of the principal articles of food for the Mackarel, &c., are the numerous young *Clupeidæ*, locally known as "Britt," and which generally abound at this period of the year. Although said to be young Herrings, *Clupea harengus*, all that I have examined, and which were received from Falmouth, were young Sprats, *C. sprattus*. The fry of this latter fish is now being captured in enormous numbers at St. Ives as bait for Gurnards, from four to six being used for each hook, the bait being threaded through the eye.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

THRESHER SHARK ON THE CORNISH COAST.—A Thresher Shark, *Charcharius vulpes*, was taken on August 10th, in Whitsand Bay, in the nets of one of our pilchard-driving boats. It measured 9 feet 3 inches in length in a straight line, and 9 ft. 8 in. on the curve, the tail being exactly 5 ft.; from the snout to the first dorsal fin, 2 ft. 2 in.; between the dorsal fins, 15 in.; from the second dorsal fin to the tail, $6\frac{1}{4}$ in.; depth of tail, $12\frac{1}{2}$ in.; from fork to upper part of tail, $8\frac{1}{2}$ in.; from vent to tail, 15 in.; girth round insertion of tail, $14\frac{1}{2}$ in. The fish had been much mutilated before I saw it, so that I was unable to take the girth of any other part. Mouth, $3\frac{1}{2}$ in. from snout; gape of mouth, 5 in. Colour, dark lead on back, white underneath. Pectoral fin, $15\frac{1}{2}$ in. long by $9\frac{1}{2}$ in. wide at base; the

abdominal fins very much smaller; the second dorsal and anal fins very small. As this is the only specimen I have seen here during a residence of more than forty years, it may be worth noting.—STEPHEN CLOGG (Looe).

PILCHARDS ON THE CORNISH COAST.—We are now (July 19th) taking Pilchards in full roe. The milt and roe are both fully developed. These are our first arrivals in any large quantities. About twenty-five years ago the Pilchard used to arrive on this coast in force about the third week in June. The date of their appearance has been gradually getting later, until now we do not see them in force until the third week in July.—THOMAS CORNISH (Penzance).

NOTICES OF NEW BOOKS.

The History of the Squirrel in Great Britain. By J. A. HARVIE BROWN, F.R.S.E., F.Z.S. 8vo, pp. 183, with a Map. Reprinted from the 'Proceedings of the Royal Physical Society of Edinburgh,' vol. v. Edinburgh: M'Farlane and Erskine. 1881.

On the Introduction of the Squirrel into Ireland. By RICHARD M. BARRINGTON, M.A., LL.B. 8vo, pp. 17, with a Map. Reprinted from the 'Scientific Proceedings of the Royal Dublin Society.' Dublin: Thom & Co. 1881.

THE notion of selecting some particular mammal or bird, and treating its life-history and distribution in the British Islands monographically, is a good one, and we should like to see more of this kind of work. In 'The Zoologist' for 1879 (p. 468) we reviewed an important essay of the kind, by Mr. Harvie Brown, "On the Capercaillie in Scotland," and his more recently published articles in this journal on the Rarer Animals of Scotland will be fresh in the minds of our readers. We have now before us a most interesting account of the Squirrel, in which the writer traces its distribution throughout Scotland, and discusses the question whether it is an introduced species or originally indigenous. His researches tend to prove that it was known to, or at least mentioned by, early writers as a native of some parts of Scotland, and had apparently a wide distribution in the pine woods and country north of the Firths of Forth and Clyde; that

it did not become absolutely extinct in Scotland, but lingered in the old forest of Rothiemurcus until resuscitated by the new growth of suitable woods; that it remained in Argyleshire until the year 1839 or 1840, when the last of its race in that part of the country is said to have been killed; and that in Ross-shire it survived in the wooded glen of Ainaig until about the close of the last century.

If ever indigenous to the South of Scotland, says Mr. Harvie Brown, the Squirrel must have disappeared from it at a very early period, advancing northwards to the shelter of the denser forests north of the Firths of Forth and Clyde; and in support of this view he comments on certain local migrations of this little animal which have been observed to take place during severe winters.

As we proceed further north, however, and approach nearer to the southern limits of the old Caledonian forest "circumstances under which we must consider the prior distribution of the Squirrel entirely alter," and Mr. Harvie Brown thinks there can be little doubt that the Squirrel was indigenous to nearly the whole mainland of Scotland north of the Firths of Forth and Clyde. Dealing with each county separately, he brings forward numerous items of information regarding the scarcity or otherwise of this little animal as observed at different dates, and furnishes many interesting particulars concerning its food and habits, and the damage caused to woods and plantations by its destructive propensity for bark and the tender shoots of growing trees. In one forest alone, that of Glen Tanar, in Aberdeenshire, in one year (1874) the Squirrels were said to have destroyed at least 1000 trees, occasioning a loss estimated at £500. In the Cawder plantations, where they were found to be very destructive, as many as 1100 or 1200 have been shot or trapped in a single year; while in seventeen years, between 1862 and 1878, no less than 14,123 were killed, for which, at the rate of threepence and fourpence a head, the sum of £213 odd was paid. These figures will give some idea of the immense amount of damage to plantations such an army of Squirrels would cause.

The statistics which Mr. Harvie Brown has collected on the vexed question whether Squirrels prey on young birds and eggs prove conclusively that they do; not as a habit, however, but as an exception and an acquired taste.

The question whether the Squirrel is a native of Ireland or has been introduced, is dealt with by Mr. Barrington in the essay of which we have given the title above. The doubt which has been expressed on the subject does not appear to be yet quite resolved, but Mr. Barrington adduces strong evidence to prove that the animal is not indigenous, and that its existence in Ireland is due to human agency exercised at no very recent date. Through the kindness of correspondents, he has been enabled to trace the occurrence of the Squirrel in every locality in Ireland where it is known to exist, with great probability to what he terms "local centres of introduction."

In some cases it is possible to follow its course and fix the dates of its occurrence as it advanced from district to district from the local centre. "No circumstances," says Mr. Barrington, "shows with greater force that the Squirrel is no more a native of Ireland than the Mole, the Dormouse, the Voles, and many other mammals common in England, than its present distribution. We are forced to conclude that, like the Frog, it has been introduced; for it is impossible to reconcile the theory of extinction and subsequent reintroduction with the great rapidity of its increase."

Mr. Barrington traces the present distribution of this little rodent from each separate centre of introduction, and, as it seems to us, adduces strong evidence in support of his views above expressed, his case being made all the clearer by the carefully prepared map which accompanies it.

Ostrich Farming in South Africa. By ARTHUR DOUGLASS. Post 8vo, pp. 251, with map and illustrations. London: Cassell, Petter, Galpin & Co., and Silver & Co. 1881.

No matter what form of enterprise a man may embark in, no matter what special line of research may engage his attention, it is almost certain that, through the medium of advertisements and reviews, he must sooner or later be made acquainted with the existence of any modern publication bearing on his *specialité*, even if he does not actually procure the work, as it is natural to suppose he would do. In 1876 appeared a volume entitled 'Ostriches and Ostrich Farming' (see Zool. 1876, p. 5173), of which a second edition was issued in February, 1879 (Zool.

1879, p. 496), and of which some few hundred copies, as we have reason to believe, were despatched for circulation in South Africa. It is not unreasonable to suppose that a book with such a title would attract the notice of those who, like Mr. Douglass, are financially interested in the success of Ostrich farming. Yet, if we are to credit the statement made in the preface of the volume before us, Mr. Douglass seems never to have heard of it. Numerous letters, he tells us, have been addressed to him from all parts of the world asking if any such book were to be had, and the only inference which the reader of his preface can draw is, that the author was unable to name any such work. On the contrary, the latter claims for his own recently published volume that it is "the first work of its kind ever published." Now, so far from this being the case, it is not the second, nor even the third, of its kind; and it is therefore not a little surprising that a preface, dated London, June, 1881, should contain so pretentious, and, at the same time, so inaccurate a statement. It is true that the second of the three books to which we have referred (that by M. Oudot, published in Paris, 1880), although professing to be original, is a barefaced appropriation of the greater portion of Messrs. Mosenthal and Harting's work, disguised in a French dress, with the addition here and there of what is technically termed "padding," the translator and appropriator having had the effrontery to announce, on his title-page, that the right of translation and reproduction was reserved! A bolder stroke of plagiarism than this we never heard of. But we are not now reviewing this production of M. Oudot, and only refer to it for the purpose of showing that it was published long before Mr. Douglass wrote his preface. So also was an excellent essay by Mr. J. S. Cooke, which appeared last year, and which contains much practical information on the subject of Ostrich farming, personally collected by the author in Cape Colony.

As a writer on this subject, therefore, it is clear that Mr. Douglass has come somewhat late into the field. Had he only made himself acquainted before writing with what previous authors had written on the subject, he would not only have saved himself a considerable amount of trouble, but would have avoided some of the errors into which he has fallen on the subject of the rise and progress of Ostrich farming and the so-called natural history of the bird.

But we must do Mr. Douglass the justice to observe that his remarks on the breeding and rearing of Ostriches, and on the general management of an Ostrich farm, are not only original, but of much practical value. His long personal experience as one of the largest Ostrich farmers in South Africa, and the success which has attended his experiments in designing and perfecting an artificial incubator, certainly qualify him to write with authority on the subject, and we do not doubt that his book will prove of much utility, not only to those who have already established Ostrich farms in the Colony, but to others who, having capital at command, are disposed to invest it in what with good management appears to be a very profitable undertaking.

The Insect Hunter's Companion. By the Rev. JOSEPH GREENE, M.A. Being instructions for collecting and preserving Butterflies, Moths, Beetles, &c. Third edition, revised and extended by A. B. FARN. The chapter on Coleoptera by E. NEWMAN. 12mo, pp. 114. London: Swan Sonnenschein & Allen.

THE fact of this little manual having reached a third edition renders any word of recommendation from us almost unnecessary. It shows how popular is the pursuit of insect collecting, and how continued is the demand for information on the subject.

We fear, however, that with a good many people there is no other aim but that of making a collection of beautiful or rare natural objects, and that as soon as this is accomplished there is an end of Entomology.

Of those who turn their collections to good account the percentage is probably very small. It is perhaps, therefore, quite as well that Mr. Farn should, in his preface, offer some remarks on this point. "While giving practical details," he says, "of how to rear, capture, and preserve specimens, it must not be thought that the end to be attained by an entomologist is simply the acquisition of a collection. Apart from the pleasure of collecting—a pleasure it would be difficult adequately to describe—it should be borne in mind that this should be a means to an end; and perhaps the grandest end which may be striven

for in the pursuit of Entomology is a knowledge of how to combat those insects which cause incalculable damage to the agriculturist especially, and to mankind generally."

It is to be hoped that these remarks will be taken to heart by young collectors, and that the useful hints which are given for collecting, rearing, setting, and preserving insects, all of which have borne the test of actual experience, will in due course be turned to good account by those for whose benefit they have been detailed.

A Zoological Atlas (including Comparative Anatomy), with practical directions and explanatory text. For the use of Students. 231 coloured figures and diagrams. By D. M'ALPINE, F.C.S., Lecturer on Biology and Natural History, Edinburgh. (Vertebrata). Edinburgh and London: W. & A. K. Johnston. 1881.

IN most recent works on Biology the authors very properly insist on the necessity for practical work in order to thoroughly understand the subjects, but no attempt hitherto seems to have been made to depict what to see as well as describe how to see it.

In the Atlas before us a series of forms, gradually increasing in complexity, are examined externally and internally, and the results of that examination carefully drawn, so that by a previous study of a plate of any given species the specimen itself is easily understood. The species selected in the present case are the Skate, Cod, Salamander, Tortoise, Pigeon, and Rabbit, all easily procurable forms, and of a convenient size for dissection. We observe that the names of the various parts are placed on the drawing, a very commendable feature; thus the attention is not distracted by referring to an index, and there is no chance of a mistaken reference; while the accompanying descriptions in every case very properly face the plates. These seem to have been prepared with great care and accuracy, and, as an aid to teachers, will be found extremely useful. Indeed, with such an Atlas before him, and a good text-book, the student might almost dispense with the services of a professor.

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ANIMAL LIFE IN BORNEO.

BY W. B. PRYER, C.M.Z.S.

A FEW remarks about the animals to be found in the neighbourhood of Elopura, Sandakan Bay, may perhaps be acceptable to naturalists. Some months ago I was requested by the Secretary of the Zoological Society to try and secure for him a few of the common *Gymnura* (*G. Rafflesii*).^{*} The Sooloos of these parts are not clever trappers, and it was no use asking them; but there was an adept at hand, who had been employed by Mr. Low for a similar purpose, and on application to him this nobleman in reduced circumstances undertook to trap for me, and the result was a perfect deluge of birds and animals of all kinds—Argus Pheasants, Partridges, *Gymnuras*, *Tingalums*, *Musangs*, and other things—the market, in fact, was overstocked.

The trap used is a cruel one: a loop arranged at the end of a stout bent sapling, so that when an animal is noosed it is suddenly jerked, usually by one leg, upside down in the air, and held suspended until the trapper comes round, which is generally not

* This curious animal, the native name for which is *Bulau*, may be regarded as a connecting link between the Hedgehogs and Shrews, resembling a Hedgehog with flexible hairs, and having an elongated shrew-like head, and a long, almost bare tail like that of a rat. It was originally discovered in Sumatra by Sir Stamford Raffles, who described it as a Civet under the name *Viverra gymnura*, and besides inhabiting Borneo is also found in the neighbouring island of Sarawak. It is about two feet in length, of which one half is tail.—ED.

till some hours later, when its leg in most cases is found to be broken. This sort of thing does not conduce to longevity, and accordingly, after spending some fourteen or fifteen dollars, I had to leave off buying.

Amongst the victims there were brought to me some ten or a dozen *Gymnuras*. They are stubborn, pig-like animals, with a strong rancid smell, and their most noticeable peculiarity is that if you approach close to them they jump into a threatening attitude, with jaws wide open, and so remain for a long time. On putting a bit of stick near it is seized with one sharp snap, the imprint of the teeth being left visible. Those brought me here were of a pure milk-white; others that were obtained about fifteen miles away had all the longer hairs tipped with black.*

There is very little animal life to be *seen* in the tropical forest round this place. I may take half-a-dozen long walks through the forest without seeing a single creature, even though it be but a Monkey or a Squirrel; yet there are plenty of animals if they would only show, but they are nearly all nocturnal, and where they hide in the day it is hard to say. This I could understand in a country where any species of the flesh-feeding *Felidæ* occur, but here there is nothing more formidable than a Civet or a Musang. That animal life abounds, however, is plain; one has only to visit the top of any small hill, and a regular path is found to be worn along the ridge of it, entirely made by the numbers of small mammals that continually wander about at night.

Of the wild animals of this particular district (spoken of by old travellers as "Felicia") the most noticeable is the Elephant. That it should occur in Borneo is only what might be expected, but why it should be confined to this part of the island is strange. To the south of the Bay of Sandakan vast herds roam the forest. The proportion of tuskers to the others is about one in four or five. The natives of these parts are not great hunters, but they sometimes find it necessary to turn out in defence of their crops and kill one or two.

Rhinoceroses are not infrequent; the tracks of one or two may usually be seen in the course of a walk in the low districts. I have

* The general colour of Sumatran specimens is blackish grey, with the head and neck much paler, inclining, in fact, to white, and with a black streak over each eye. Those procured in Sarawak are said to resemble the Bornean type.—ED.

sent home three or four skulls, which have been identified as those of *R. sumatrensis*. The natives declare a three-horned species exists, and I have seen a skull which I should not like to say was *not* a three-horned one, the third horn, however, being very small.

Sportsmen may be interested to learn that a fine large species of Red-deer, probably a Sambur, is common enough in the forest,* besides one or two species of the genus *Bos*. I have seen a herd of at least fifty wild cattle at once, and was confronted by the patriarch, an enormous bull with splendid horns, who looked at me, down a glade in the forest, and seemed much inclined to charge. Having seen his harem, however, safely out of danger, he trotted off after them. All the individuals in this herd were coal-black. The only species I have been able to identify with any certainty is *B. Banteng*,† Raffles; but I am nearly sure we have also common wild cattle, in all probability descendants of beasts turned loose by some of the early navigators who visited these parts.

Bears (*Ursus malayanus*) and a species of Roe-deer [quære, *Cervulus muntjac*?—ED.] are to be met with sometimes; Mouse-deer (*Tragulus javanicus*) are plentiful in places, but can hardly be dignified with the title of "big game"; while of wild pigs I believe I have made out four distinct species, one of which seems identical with the *Sus leucomystax* of North China, and another, like the wild cattle, appears to be of European origin.

Of other animals perhaps the most interesting that I have seen is a *Mydaus*, which is said not to have occurred at a lower elevation than 7000 feet.‡ Here, however, we get it at sea-level, and there are hardly any hills above a few hundred feet high within forty miles of us. The smell of this animal appears to me to have been somewhat overstated, although I must say that once

* Is this distinct from *Cervus equinus*, Cuv., found in Borneo, Sumatra, and Singapore; and is *equinus* distinct from *C. aristotelis*, Cuv.? Sir Victor Brooke refers to intermediate forms (skulls and antlers) which he has seen (Proc. Zool. Soc., 1878, p. 901).—ED.

† Better known as *Bos sondaicus*, an introduced species in Borneo. What the "common wild cattle" may be, if not *sondaicus*, remains to be ascertained.—ED.

‡ Of this genus *M. meliceps*, Cuv., is recorded from Sumatra and Java; *M. taxoides*, Blyth, from Assam and Araccan.—ED.

or twice when the dogs had been tackling one in the forest I have had to keep them out of the house for three weeks afterwards!

As it is said that *Galeopithecus* can alter its course of flight but in the smallest degree, I may mention that a very short time ago I saw one not only turn right round in its course, but, distinctly flapping its membranes, rise up a steep hill-side to the base of a tree some ten or twelve feet above the lowest point it had reached. I was within a very few yards of the tree at the time, so there could be no mistake in this observation.

Two or three species of *Tupaia* are, with the exception of Monkeys, the commonest animals in our forest; they, together with Squirrels, are spoken of by the natives under the common name of "Bassins" [or "Bangsrings."—ED.]. One, the largest of all, is a very handsome animal, having particularly thick glossy fur and a remarkably bushy tail; the head also is by no means sharp, so that the resemblance to a large Squirrel is most complete. None of the species I have seen are able to curl their tails up their backs, squirrel fashion, as I notice one is made to do in a sketch in a certain book on Natural History. The leaps from tree to tree taken by these animals are something extraordinary to see.

We have no great number of reptiles here at Elopura, but, as with mammals, the species are varied. Snakes are rarely seen, and of these not one in ten is poisonous. In all my wanderings in the forest I have only come across two poisonous species. On one occasion I was pushing my way through some low bushes when I almost came face to face with a small green viper coiled on a branch about five feet from the ground; drawing back a yard, I struck about the middle of its coil with a sharp wood-knife I had in my hand, and it fell to the ground in a perfect little shower. The strength of the poison possessed by this species is very great. I one day took a kitten, and holding one of these vipers by the back of the neck, pressing it so as to open its mouth and project its poison-fangs, made just the slightest scratch on the kitten. With one bound she was out of my hands, and running about twenty yards fell over on her side motionless, and so remained for over a quarter of an hour when she began to recover, and at the end of two hours had quite recovered, and never seemed any the worse for it. All the poisonous Snakes here are extremely lazy, and the smaller species just referred to

are very good tempered. I have carried them about loosely myself, always taking care never to provoke them, however! I once saw a little boy pulling one about quite roughly, and, after satisfying myself that the teeth were not extracted, I destroyed it for fear of accident. I must say I do not quite regard snake-charming as some people do. Anyone who has ever kept a non-poisonous Snake knows that with a very little caution, and when the Snake has come to know him, it can be handled and even played with freely; and if non-poisonous, why not poisonous species as well?

The Chameleon found here has but two changes of colour—green and greyish brown; the latter is its natural colour apparently, while it more usually adopts the former. The change of hue is instantaneous. I caught one in my butterfly-net on one occasion; it had been green while in the bush when I struck at it, but on the moment it changed to greyish brown. On another occasion the change absolutely took place before my eyes. If hurt or damaged, however, they do not seem to have strength enough to alter the colour, but remain green, which may be taken as a sign that they will die. If on any tree trunk or other dark-coloured substance, very likely (though I am not sure) they adopt the greyish brown hue.*

Various species of Flying Lizard (*Draco*) are rather common; they usually go in couples, for what reasons I do not know, but whenever I see one fly across from one tree-trunk to another I remain still and in a quarter of a minute another is sure to follow; on two occasions I have seen three, so that I am inclined to think it is more for company than anything else. These lizards also seem to possess some slight power of changing their colour. I saw one whose body alone was eight or nine inches long; the inner part of the membrane was red, and as it glided through the air I really thought it was a good-sized bird.

There is a queer sort of frog here which occurs in my bath-room and apparently nowhere else; it turns from a colourless grey to a sort of brown; it is very thin, and can jump a

* According to Prof. Mivart ('Nature,' 11th August, 1881. p. 336) there are fifty known species of Chameleon. The species found in Borneo is presumably *C. vulgaris*, which occurs in Southern Spain, Northern and Southern Africa, Asia Minor, Arabia, Hindostan, and Ceylon. No other species has so extensive a range.—ED.

preposterous distance; usually, however, it is quite still, and, flattening itself up against the wall, quietly remains there for a week together without moving. In jumping it extends its broad webbed feet so as to make its descent somewhat of a swoop.

The only other reptile I can think of, worthy of notice, is the Monitor Lizard, which grows to a very large size. I obtained one of eight feet. These brutes are very destructive to chickens, and hardly a day passes without a "hullabaloo" in some one's chicken-yard. They never show fight, but take a tremendous lot of killing. Dogs think them rather "fun"—good things to practise on—but they rarely give a run, as they usually make their approach from some pile of wood or other good description of cover. They are diurnal; so that, what with Musangs and Civets at night and Monitor Lizards by day, chicken-keepers learn a good deal more practical Zoology than they at all desire to do.

I am not sure whether I have found a new species of Monkey or not, and should be glad to know if there is only one species of Proboscis Monkey (*S. nasalis*) known, or two.* I have one very distinct from it. In 'Cassell's Natural History' I read of the Variegated Monkey (*S. nemæus*)—"They yield to the researches of the anatomist the same internal arrangement of the cavities of the stomach which has been noticed in the Long-nosed Monkey." In its markings the one I got exactly resembled the picture given of *S. nemæus*, but it had a nose as large as *S. nasalis*; it was three feet eight inches high, about as big as the smaller species of Orang-utan, strongly built, and with a determined expression on it; while *S. nasalis* is a weak-jointed feeble-looking creature. I got this specimen on the island of Balhalla, just outside the Bay; and if there was one there, it may be reasonably presumed there are more.

* There are said to be five species of the genus *Semnopithecus* in Borneo, but we are not aware that more than one of these (*S. nasalis*) has the remarkably elongated proboscis.—ED.

THE WHITE-BACKED WOODPECKER NOT A BRITISH BIRD.

BY ALFRED NEWTON, M.A., F.R.S.

SINCE, of necessity, some time will elapse before the appearance of Part XV. of the revised edition of Yarrell's 'British Birds,' to which I have to defer my remarks on the various foreign species of *Picidæ* which are reported to have occurred in this country, it may interest the readers of 'The Zoologist' to know that the claim advanced on behalf of one of them—*Picus* or (as I prefer calling it) *Dendrocopus leuconotus*, the White-backed Woodpecker—is, in my opinion, wholly inadmissible. That claim rests solely upon a specimen, said to be one of those which were recorded nearly twenty years ago (Zool. 7754, 7932) as obtained by the late Dr. Saxby in Shetland and referred to this species by the late Mr. Gould, by whom it was figured in his 'Birds of Great Britain,' as Mr. J. H. Gurney rightly states (Zool. s. s. 4695). Thanks to its owner, the gentleman last named, I have been allowed to examine it, and I may say that not much comparison was needed to excite my suspicion that Mr. Gould was absolutely mistaken in his determination of it. It was so minutely described by Messrs. Dresser and Sharpe, in their 'Birds of Europe,' as a variety of *Picus* or (as I should say) *Dendrocopus major*, that I need not enter into many particulars.

Apart from size and the form of the beak, the most obvious distinction between *D. major* and *D. leuconotus* is that the latter has the middle of the back white, and the scapulars black, while in the former the allocation of these colours in those parts is reversed—*D. major* having conspicuous white scapulars (with a few occasional dark marks), and the back wholly black. In these respects Mr. Gurney's specimen entirely agrees with *D. major*—Mr. Gould's assertion, that "if the long black feathers of the back be lifted, a large amount of white will be found beneath," being contrary to fact. Again, in *D. leuconotus* that branch of the black mandibular stripe which passes upwards behind the ear-coverts does not meet the black of the head, while in *D. major* (except perhaps in examples from near Constantinople, which in this respect show a tendency towards *D. syriacus*) the

same branch forms a complete post-auricular bar. Here again Mr. Gurney's bird agrees with *D. major* and not with *D. leuconotus*, though Mr. Gould's figure, taken from this very specimen, omits the bar altogether! Once more, *D. leuconotus* has large white spots on the greater wing-coverts, which are generally wholly wanting and never largely developed in *D. major*; and once more Mr. Gurney's bird agrees with *D. major*. Characters like these completely outweigh the slight resemblance that Mr. Gurney's bird bears to *D. leuconotus* in the indistinct streaks on the sides of the belly, which Mr. Gould thought were distinctive of the young of that species, for they occasionally occur in the young of *D. major*—though not, so far as my experience goes, in examples of British origin. But the history of Mr. Gurney's bird points to a foreign origin for it, since it was indubitably one of a number of refugees to the Shetlands (not "the Hebrides," by the way, as Mr. Gould inadvertently states), not very likely to have flown thither at that time of year (September) from any part of Great Britain. Finally to settle, as I hope, this point for ever, I have compared Mr. Gurney's bird with an unquestionably young specimen of *D. leuconotus* in the British Museum, obtained by Herr Meves at Onega, June 28th, 1869. This last resembles, as might be expected, the adult of the same species very closely, differing only just in the way that the young of most pied Woodpeckers differ from their seniors. Consequently it is wholly unlike Mr. Gurney's bird, which I can now affirm in the most positive manner is NOT *D. leuconotus*—and therefore the only claim for the admission of that species to the British list falls to the ground. Herein I may say that Mr. Seebohm, who kindly assisted me in my comparison of specimens at the British Museum, entirely concurs, as also does Mr. Salvin, though the latter had not the advantage of seeing so large a series of specimens.

Having thus proved, as I trust, that Mr. Gurney's bird is not a *D. leuconotus*,* the next thing of course was to find out what it is. Its most remarkable features, and those only which are peculiar to it, are the grey upper wing-coverts and hind-head

* To obviate any future error on the subject, I may say that it differs just as strongly (though of course in other ways) from *D. medius*, which some, according to Saxby (Birds Shetl. p. 141), have supposed it to be.

(which, I may remark by the way, are characters separating it as widely from *D. leuconotus* as from any other species known to me). Next to these are the indistinct streaks in the sides of the belly and flanks, and the pale red of the vent. Mr. Seebohm has kindly shown me two specimens shot in Heligoland in October, 1876, out of a band of visitors similar, no doubt, to that which appeared in Shetland in the autumn of 1861. Both these are, like Mr. Gurney's, birds of the year,—a fact proved not only by their red heads, but by the first primaries, which among Woodpeckers seem to be always larger in the young than in adults,—and both of them exhibit (though one much more than the other) the indistinct iliac streaks and the pale red of the circum-anal region. But both of these birds have always been accounted specimens of *D. major*, the ordinary plumage of which they in other respects entirely match, and I think he would be a bold man who would venture to refer them to any other species.*

Accordingly it comes to pass that the only points in which Mr. Gurney's bird differs from examples of *D. major* are the before-mentioned grey upper wing-coverts and hind-head—for I should perhaps have mentioned before that in size it agrees absolutely with that species. Undoubtedly these parts ought to be black, but, when we know that albinescence, or canescence, is the effect of a physiological process from which there is reason to suppose that no birds are exempt, though it is much commoner in some groups than others, I think it is but right to ascribe the abnormal appearance of Mr. Gurney's bird to this cause; and hence I wholly subscribe to the opinion delivered more than ten years since by Messrs. Dresser and Sharpe, namely, that the bird shot at Halligarth, in Unst, on the 3rd of September, 1861, by the late Dr. Saxby, the skin of which is now in Mr. J. H. Gurney's collection, is a variety of the Greater Spotted Woodpecker, *Dendrocopus major*.

20th August, 1881.

* Indeed Naumann (Vög. Deutschl. v., p. 302) describes the young of this species as streaked with blackish on the thighs and flanks.

THE BIRDS OF BRECONSHIRE.

BY E. CAMBRIDGE PHILLIPS,

Member of the Woolhope Naturalists' Field Club.

BRECONSHIRE is not a large county, and is so well known that it needs but a slight description. It embraces among its general features, in a marked degree, mountain and moor, valley and hill; it has one large lake, Llangorse, with numerous mountain tarns, and is drained by the Usk and partly by the Wye and their tributaries. Yet with all these advantages of Nature the Ornithology of the county is not so varied as might be supposed. Our grand old Beacons are singularly destitute of bird-life; on the other hand, the moors, which extend over a great part of the county, are fairly well stocked. On them, as of yore, the Red Grouse and Blackcock, the Wild Duck, Teal, Snipe, Curlew, and Plover still breed, though in much diminished numbers. Llangorse Lake unfortunately is so constantly shot over that what should be a "home for water-birds" now shelters only a few Ducks, Coots, Grebes, and Rails. Our rivers are, without exception, fast flowing, and water-birds, unless pressed by hard weather, avoid if possible (with the exception of the Water Ouzel or Dipper) these kind of streams. The absence also of a sea-coast still further reduces the number. Notwithstanding these drawbacks, Breconshire, as the following notes will show, can boast of a fair average list of birds. The rarer species are getting rarer still; in these days of cheap guns any but the most ordinary bird is at once shot down, and it is this continued diminution that has determined me to compile the following notes, which in nearly every instance have been the result of actual and careful observation. I purpose taking first the land and then the water-birds.

GOLDEN EAGLE, *Aquila chrysaëtus*.—Although there are numerous localities that are exactly suitable to its habits, I can only record one instance in which the Golden Eagle has been met with in Breconshire. About twenty-three years ago one was killed at Penpont, near Brecon, by a keeper of Mr. Williams, the owner, and through his kindness I was permitted to inspect the bird. It was stuffed very fairly by a private of the 23rd Regiment, then stationed at Brecon, but had not been cased. It showed no

marks of captivity when I saw it, none of its feathers being worn as if from confinement. I should consider it, from its plumage, to be a bird of three or four years old, and to have strayed to the Beacon in search of food. About this time I hear that another, probably its mate, was killed in the adjoining county of Glamorgan.

OSPREY, *Pandion haliaëtus*.—Although I have made many enquiries I cannot find that the Osprey ever frequented Llangorse Lake, although it might be supposed to be a locality well suited to this bird. One was killed on the Wye near Clyro, and is at present at Clyro Court.

BUZZARD, *Buteo vulgaris*.—Still fairly common. Many a time have I watched them soaring around, for hours together, high over the trees of Venny Wood, near Brecon, uttering their wailing, weird cry. They are still to be seen on the rocky hills adjoining Llanwrtyd Wells and in the various wild gorges of the Beacons. Unfortunately they are easy birds to trap, and the day will come when, as in the case of the Kite, we shall not see more than one or two in the course of the year. The Buzzard has always been considered a lazy bird; when roused it is quite the reverse, and two I trapped were so defiantly grand in their attitude that, not being much hurt, I sent them to the Zoological Gardens, knowing that they would get every attention there. One of them, I believe, lived some little time. This bird is very fond of sitting on a rock, and if by chance there is one in or near any cover it may be generally trapped on it. It is very regular in its search for food, and may be seen nearly every day in the same place about the same time.

HONEY BUZZARD, *Pernis apivorus*.—I only know of one instance of the occurrence of this bird in Breconshire. This was shot at Frwdgrech, near Brecon. I saw it in its case, but the estate having changed hands I am unable to record any of the circumstances attending its capture. It can only be regarded as a very rare visitor.

KITE, *Milvus regalis*.—This fine bird seems to be increasing here very slightly. Ten or twelve years ago it was nearly extinct, and during a like period I only saw two. Now, however, I know of three places where it breeds, and occasionally one may still be seen passing over at a great height. In the month of May, 1875, I went to a place near Upper Chapel to see the nest of a Kite,

and a drawing of it which I made at the time appeared, with a short description, in 'Land and Water' shortly afterwards. After driving as near the place as the carriage would go, we got out and walked, crossing a small valley until we reached a larch wood growing on the side of a very steep hill. The trees were large



Kite's Nest at Upper Chapel, Breconshire.

and high, and in the middle of the wood far up on one of the largest trees that suddenly forked into three gnarled branches was the nest comfortably and securely fixed between them. On striking the tree the hen bird flew out, seemingly much alarmed, whilst the male soared about in the distance, no doubt anxiously

awaiting our departure. By climbing up the brow of the wood we could look down into the nest, in which were three young ones covered with yellow down, the head of one being distinctly visible. This was in the second week of May. At the foot of the tree were some partridge-feathers, but none of those castings that are found when the young get older. The tenant told us that he had seen a quantity of castings with feathers and fur in previous years, and that in the year 1875 there were three Kites in the pairing time, but that one had left; this was most probably a young bird of the previous year that had been bred there. I hear that the birds still breed in the locality; but the fact of the one bird staying with the old ones so long will, I think, be sufficient evidence of their general scarcity.

PEREGRINE FALCON, *Falco peregrinus*. — Alas! extinct or nearly so! I have known of several specimens killed some years ago, but it never bred here. I am enabled to state this as a fact, from the information I received from old Morgan the falconer, a small farmer living at Nantyrodin, near Llanwrtyd Wells, who I may designate as one of the last of his race. I made his acquaintance when fox-hunting near the cave of Twm Shon Catti, on the Towy, some seventeen years ago; and even now I can see the spare wiry figure, with long white hair waving about his shoulders, his eyes fairly flashing with excitement as he sprang from rock to rock and cheered the hounds. Many a chat have I had with him about his favourite sport, falconry. He told me that for many years he used to walk from Llanwrtyd, in Breconshire, to Snowdon and back nearly every year to obtain young Falcons, as he could not procure any in Breconshire. He trained and flew them himself, but when I knew him he was too old to climb for them. He was very fond of a Merlin, and had trained the female Sparrowhawk to fly at Landrails. As he lived in the wildest part of the county, no one interfered with him; he was a true lover of nature, and had a wonderful knowledge of everything appertaining to the habits of birds. Poor old Morgan! kindly in his nature, pleasant in his manner, though wild at times as the hawks he trained and as the scenery among which he lived—he is gone; and with him, in this part of the county at least, the practice of his favourite pastime. During my residence in this county (some seventeen years) I have never seen the Peregrine alive. I have, however, seen several stuffed

specimens, notably a young Falcon obtained from the rocks at Abergwessin.

HOBBY, *Falco subbuteo*.—Very rare in this county. I have only seen two stuffed specimens, one a large hen bird which was killed near Brecon, and another killed near Nantgwilt.

MARSH HARRIER, *Circus rufus*.—This bird was formerly common on the hills between the Storey Arms and Merthyr. There are three beautiful specimens, killed in this county and splendidly preserved by Leadbeater, in the possession of Mr. David Thomas, of Brecon.

HEN HARRIER, *Circus cyaneus*.—Now nearly extinct. A pair for years nested on the Breconshire side of the river near Nantgwilt, Radnorshire, but were at last trapped on account of their extreme destructiveness and their nest and eggs taken. I am indebted for the above information to a lady, one of the members of the Nantgwilt family, herself a keen lover of Nature and a great preserver of all wild birds, who kindly showed me the hen bird, which had been preserved and was in her possession. She has also a specimen each of the Hobby and Merlin, killed at the same place, and several Buzzards, which bears out my statement that the Buzzard is still far from rare in the county.

MERLIN, *Falco æsalon*.—Cannot be considered common. I have only seen it once on the wing near Brecon. A friend of mine killed one near the town in excellent plumage, and I have seen several others stuffed. This beautiful and bold little fellow should be let alone; there are plenty of small birds for him, and if he does occasionally fly at higher game by all means let him have it. Mr. Dilwyn Llewellyn thinks that this hawk is often taken on the wing for the male Sparrowhawk, and that it is more common than is generally supposed, and his authority is not to be slighted.

KESTREL, *Falco tinnunculus*.—The English name of Windhover seems most appropriate to this common bird, for it is always hovering in the air. Many writers assert it is a useful bird, from the quantity of mice it destroys; I think, however, that it kills what it can. A friend of mine had a nice brood of Pheasants, which he put under a hen, and for greater security he put them directly in front of his window; day by day they improved in size, but decreased in numbers, until they were nearly all gone, in spite of careful watching; one day, however, like a flash of

light a hawk darted round the corner and took one of them; a lucky shot laid him low, and on picking him up the culprit was found to be a Kestrel.

SPARROWHAWK, *Accipiter nisus*.—Very common. I once found a Sparrowhawk in a singular situation; going to my garden in Brecon one night in the dead of winter, to catch some game bantams that roosted in a thick holly-tree, I turned a lantern on them suddenly, and there saw a hen Sparrowhawk roosting close by the bantams! I carefully put my hand over its back, but directly I touched her she dashed off into the darkness and I saw her no more; what she was doing there I cannot make out, but I imagine that the night being bitterly cold she must have crept up to the fowls for warmth. On another occasion during a continued snow I saw a Sparrowhawk make a most determined attack on a duck-wing bantam cock, and had she not been driven off I believe she would have killed him. A station-master who lives on the borders of this county, and who keeps canaries in the large glass window of the station, tells me that he has caught three Sparrowhawks that have struck at the canaries, two of which dashed right through the glass and were killed, and the other stunned itself and was picked up outside the window.

LONG-EARED OWL, *Otus vulgaris*.—I consider very rare here. Mr. Dilwyn Llewellyn has observed it in Glamorganshire. I have known of so very few specimens, that I imagine it favours Glamorganshire more than this county.

SHORT-EARED OWL, *Otus brachyotus*.—Also very uncommon. Although I have for years shot over open heaths and the like places, I have never seen it. It is, however, fairly common in Glamorganshire.

BROWN OWL, *Syrnium aluco*.—Much commoner than the Barn Owl. In nearly all the woods about Brecon, and in the Priory-groves adjoining the town, as evening approaches one may hear them. They frequent a large elm-tree growing close to my house, where they terrify the servants, who are most superstitious, with their cries. Among the Welsh it is considered most unlucky to kill an owl, but whether this accounts for their numbers is more than I can say; it may possibly have something to do with it.

WHITE OR BARN OWL, *Strix flammea*.—Common throughout the county, but not nearly so numerous as the last-named.

When returning from an evening's ramble I sometimes see it gliding with noiseless flight over the fields. On all "keepers' trees," where one so often picks up a lesson in Ornithology, the Brown Owl outnumbered the Barn Owl considerably. The keepers, as a rule, wage dire war against the poor owls; they make a great show on a tree, and are very easily trapped; while, after all, the harm they do is small. The Barn Owl is a positive benefactor to the farmer from the quantities of mice it kills.

GREAT SHRIKE, *Lanius excubitor*.—I imagine this to be only a very occasional visitor, although one was obtained some ten years since in the adjoining county of Glamorgan by Mr. Dilwyn Llewellyn.

RED-BACKED SHRIKE, *Lanius collaris*.—Common. I have often observed it in the hay-fields adjoining the town perching on the hedges, the brilliant colour on the back of the cock rendering it very conspicuous.

MISSAL THRUSH, *Turdus viscivorus*.—Very common; it nests in my garden every year, where it attacks every living thing in the shape of a bird, uttering its harsh grating cry. It is one of our boldest birds in the breeding season, and seems during this time to lose every vestige of its shyness.

SONG THRUSH, *Turdus musicus*.—Very common. The hard winter of last year has, however, sadly reduced their numbers; and quantities were found dead in the severe snow-storm of last January.

BLACKBIRD, *Turdus merula*.—Very common. Much more so, indeed, than the Thrush; they seem to stand the cold better than the latter bird. I have observed several more or less white, and of all the Thrush family this bird seems peculiarly susceptible to white markings in its plumage.

FIELDFARE, *Turdus pilaris*.—Common in winter, when its appearance is hailed with delight by the sportsman, who knows that it arrives about the same time as the Woodcock. It is a very wary bird, and can take excellent care of itself, as anyone who has attempted to shoot it has no doubt found out to his cost.

REDWING, *Turdus iliacus*.—Equally plentiful; it arrives at the same time and generally in company with the Fieldfare; it sometimes stays latest on in the spring, and once in Wiltshire I heard

it singing at that time. Until then I had no idea its song was so beautiful. A flock of several were singing on a thorn, and, not knowing the song, I killed one and found to my surprise it was a Redwing.

RING OUZEL, *Turdus torquatus*.—Fairly common at times on our heathery moors. I have observed it on a hill called the Crug, near Brecon, and generally in the autumn.

WATER OUZEL or DIPPER, *Cinclus aquaticus*.—One of our commonest birds. Wherever the stream flows swiftest and strongest, there on a rock in mid-stream—the happiest and merriest little fellow of all our birds—you will see the Dipper. Such an active, bustling, and important bird; now dabbling in the water, now splashing about in his glee, then off down stream like an arrow, uttering its gladsome cry. This bird is a great favourite of mine, and I have often watched it carefully. The late Frank Buckland used to say he was not sure whether it ate the salmon-spawn or not. I do not think it does, but feeds on water-insects. I have never observed it with spawn in its mouth; and if perchance it should take fish for its first course, I am sure we can spare the spawn. I am informed by those that have had the cruelty to try it, that if you rob the Dipper's nest it will not forsake it, but lay an incredible number of eggs: such is its fearlessness.

SPOTTED FLYCATCHER, *Muscicapa grisola*.—Common. It may be generally seen in some of the gardens around Brecon, where it hawks for flies, and its movements when so doing are very elegant and beautiful.

PIED FLYCATCHER, *Muscicapa luctuosa*.—This county seems to be a favourite resort of this bird, and I may say with truth that it is fairly plentiful. It has bred in my garden at Vennyvach, and it nests also in several places in and near this town. Ornithologists residing here (and they are very few) agree with me that it is far from rare; and therefore I can only arrive at the pleasant conclusion that, although elsewhere generally considered a scarce bird, this county seems exceptionally favoured.

(To be continued.)

NOTES ON THE FOOD OF BIRDS.

COLLECTED BY FRANK NORGATE.

(Concluded from p. 325.)

LAPWING.—Insects, slugs, and earthworms (Yarrell).

TURNSTONE.—Small Crustacea and Mollusca (Yarrell). During summer feeds on bees, larvæ of *Argynnis chariclea* and *Dasychira grænlantica*, and *Tipulæ*. Stomachs almost filled with larvæ (Yarrell).

SANDERLING.—Sea-worms, small Mollusca, shrimps and other Crustacea, minute beetles, small white worms, sandhoppers (Stevenson).

OYSTERCATCHER.—Marine insects, worms, and Mollusca (Yarrell). Limpets, mussels and cockles (Harting).

CRANE.—Aquatic plants, worms, reptiles, molluscs, and grain (Yarrell).

HERON.—Fish, reptiles, small mammals, and birds (Yarrell). Frogs, water beetles, boat-flies, water rats, and especially pike-fry and eels (Stevenson). Feeds its young with eels; these and pike seem to be about the most destructive fish we have in our British fresh-waters (F. N.) The Heron also devours young wild ducks, and will take young Moorhens from the nest (Harting).

PURPLE HERON.—Aquatic insects, small mammals, reptiles, and fish (Yarrell).

GREAT WHITE HERON.—Fish, aquatic insects, molluscs, and reptiles (Yarrell).

BUFF-BACKED HERON.—Attends cattle, and eats insects from and amongst them (Yarrell). On the banks of the Perak River an allied species of Heron, *Buphus coromandus*, attends buffaloes, perching even on their backs and freeing them from ticks and other obnoxious insects ('Field,' March 6th, 1880).

SQUACCO HERON.—Insects, molluscs, and small fish (Yarrell).

LITTLE BITTERN.—Frogs, fry of fish, insects, molluscs, and small reptiles (Yarrell).

BITTERN.—Insects, *Dytiscus marginalis*, *Notonecta*, and eels (Stevenson). Coleoptera, small mammals, small birds and fish (dace), frogs, warty lizards, and young Water Rails (Yarrell).

NIGHT HERON.—Aquatic insects, small reptiles, and fish (Yarrell).

WHITE STORK.—Reptiles, fish, young water-fowl, aquatic insects, worms, small mammals (Yarrell). Snails and frogs; it refuses toads (Stevenson).

BLACK STORK.—Fish, eels, large insects, worms, mice, and reptiles (Yarrell).

SPOONBILL.—Sandhoppers, shrimps, small fish, aquatic insects, molluscs, and small reptiles (Yarrell).

IBIS.—Small reptiles, fry of fish, small Crustacea, aquatic insects, worms, &c. (Yarrell).

CURLEW.—Marine insects, worms, and small Crustacea (Yarrell). On sandy parts of the coast feeds largely on cockles (Harting).

WHIMBREL.—Insects and worms (Yarrell).

SPOTTED REDSHANK.—Minute spiral univalves, aquatic insects, worms, and small Testacea (Yarrell). Small beetles (Harting).

REDSHANK.—Aquatic insects, marine and other worms (Yarrell). Vegetable fibre and minute particles of grit often found in the stomach, together with small beetles and fragments of small univalve Mollusca (Harting).

GREEN SANDPIPER.—Worms (Yarrell). Small beetles (Harting). Spiders, woodlice, small red worms, and small freshwater snails (Stevenson).

WOOD SANDPIPER.—Insects and worms (Yarrell).

GREENSHANK.—Small fish, smelts, bearded loach, insects, worms, Crustacea and Mollusca, shrimps (Yarrell).

AVOCET.—Thin-skinned Crustacea, aquatic insects, worms (Yarrell). Small black beetles which abound in the mud banks of the river at Breydon (Stevenson).

BLACK-WINGED STILT.—Aquatic insects (Yarrell). "A Stilt was seen snapping at insects buzzing round it" (Stevenson). Small thin-shelled Mollusca (like *Physa* and *Succinea*), which it picks off the leaves of aquatic plants (Harting).

BLACK-TAILED GODWIT.—Insects and their larvæ, worms, &c. (Yarrell). Small univalve Mollusca (Harting).

BAR-TAILED GODWIT.—Aquatic insects, worms, and mollusks (Yarrell).

RUFF AND REEVE.—Insects and worms (Yarrell). Reeve, small bronze-winged beetles and earwigs (Stevenson).

PRATINCOLE.—Beetles (Stevenson).

WOODCOCK.—Common earthworms in great quantities (Yarrell).

GREAT SNIPE.—Larvæ of *Tipulæ* or congenerous flies (Yarrell).

SNIPE.—Insects, worms, and Mollusca (Yarrell). Earthworms, insects, and small Mollusca (Stevenson).

JACK SNIPE.—Small beetles (Stevenson). Small white larvæ and seeds (Yarrell), and worms (Harting).

CURLEW SANDPIPER.—Sandhoppers, insects, worms, and small Crustacea, such as shrimps (Yarrell). Coleopterous insects and small worms (Stevenson).

KNOT.—Aquatic insects and bivalves (Yarrell). Of a number of Knots' stomachs examined during the British Polar Expedition of 1875-6 only one contained any food; this consisted of two caterpillars of *Dasychira granlandica*, Wocke, one bee, and pieces of an Alga, *Gleocapsa magna*, Klr. (H. C. Hart).

BUFF-BREASTED SANDPIPER.—Land and marine insects, particularly grasshoppers (Yarrell).

LITTLE STINT.—Mollusca, aquatic insects, worms, small Crustacea (Yarrell). Flies (Stevenson). Small beetles (Harting).

TEMMINCK'S STINT.—Insects and worms (Yarrell).

PECTORAL SANDPIPER.—Small Coleoptera, larvæ, *Ulva latissima*, and some species of *Fucus* (Yarrell). Insects (Stevenson).

DUNLIN.—Minute Coleoptera (Stevenson). Aquatic insects, worms, Mollusca, and small thin-skinned Crustacea (Yarrell).

PURPLE SANDPIPER.—Marine insects, &c. (Yarrell). Small Mollusca, shrimps, and sandhoppers.

GREY PHALAROPE.—Small flies and beetles (Stevenson).

RED-NECKED PHALAROPE.—Flies (Stevenson). One which was caught and brought to me was so tame that it swam about in a small basin of water, and ate many small flies which I dropped on the water as fast as I could supply them, and whilst my hand was within a few inches of the bird (F. N.)

BEWICK'S SWAN.—The gizzard of one shot in Norfolk in February, 1880, contained silt, pond-grass, water insects' legs, and the tail of a small fish (J. H. Gurney, Jun.).

SCAUP and COMMON SCOTER.—Marine Mollusca of various species, the gizzards being sometimes crammed with fragments of the shells (Harting).

COMMON TERN.—Small fish, shrimps and sandhoppers, moths, and craneflies (Harting).

ARCTIC TERN.—The chief food of those examined during the British Polar Expedition of 1875-6 was "green caterpillars,

Argynnis chariclea and *Tipula oleracea*; stomachs examined sometimes contained over a dozen caterpillars" (H. C. Hart).

BLACK TERN.—Very useful; destroys quantities of crane-flies, *Tipulæ* (Harting).

GLAUCOUS GULL.—Probably often depends upon Lemmings for food (H. C. Hart).

BUFFON'S SKUA.—Discovery Bay, June, 1876. "As far as my actual observations went, these Skuas subsist entirely upon Lemmings, numerous specimens which I dissected containing remains of this animal alone: they seem, however, in all cases, to reject the entrails" (H. C. Hart). The Buffon's Skuas examined by Mr. Seebohm at the mouth of the Petchora River had been feeding on beetles (Seebohm, 'Siberia in Europe').

The young of small birds are fed, almost exclusively, on insects injurious to man (M. Florent Prevost).

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 364.)

Genus HYAS, Leach.

This genus somewhat resembles the genus *Pisa* in its general features, though its specific characteristics and minor details stamp it at once as quite distinct; like *Pisa*, too, this genus consists of two species hitherto known to Britain. The genus *Hyas* is another of the large group of Crustacea popularly called "spider crabs." The carapace is roughly triangular, with the lower angles rounded and the anterior angles cleft to form a rostrum; there is a notch for each orbit into which the eyes are capable of being turned back. The antennæ are short, the peduncle very slightly hairy. The legs are long, nearly cylindrical, and tapering, the anterior pair being developed into broad forceps, the second joint being slightly tuberculated. The legs are armed with a sharp claw, but are not adapted, like those of *Pisa*, for clenching a hold on Algæ. The abdominal somites are seven in number in each sex, those of the male being wider at the third and sixth somite, whilst those of the female are broad and pear-

shaped; those of both sexes are divided by a ridge equally and vertically.

Hyas araneus, Leach.

This species may readily be distinguished from the following by its size, although when this cannot be relied upon the structure of the carapace is sufficient. The carapace is covered with small tubercles and a few spines. Its lateral margin is a double curve formed by the rounded basal angles and the contraction of the anterior portion terminating at the point at the base of the orbit. The colour of this species varies from reddish yellow to pale brown, some that we obtained from the coast of Sussex being remarkably clean and of a beautiful Venetian red tint, whilst others that were collected from the Thames estuary, though very fine, were of a dingy pale brown and dotted here and there with extraneous growth.

We have referred to the large size to which this species sometimes attains. Prof. Bell gives the dimensions of a male, which are as follows:—Length of carapace, 3 in. 6 lines; breadth of ditto, 2 in. 6 lines; length of anterior legs, 5 in. 3 lines. Dr. Howden (Zool. 1853, p. 3838) records specimens of males obtained from crab-pots off Prestonpans which measured twelve inches from tip to tip of third limb.

Prof. Bell records this species as having been taken in the following localities:—Worthing; coast of North Wales; Hastings, in considerable abundance; Sandgate, on oyster-beds, of large size; Carrickfergus; Youghal; Dublin; Loughs of Strangford and Belfast; Bundoran; and the coast near Edinburgh. We have obtained it freely from the channel off the Sussex coast, the Thames estuary, and off the Essex coast. It has also been recorded from St. Andrews, abundant; Shetland, large specimens from Laminarian zone; Belfast; North and West of Ireland, common; Dublin; Galway, common; and South Devon. From these it would appear that this species is very generally distributed. We are not aware of its being used anywhere in this country as an article of food.

Hyas araneus is with ova in the early part of the year. The ova superficially resemble those of the genus *Pisa*, except that they are paler in colour.

Hyas coarctatus, Leach.

This species, although resembling the former in all its generic details, presents such a distinct difference from it as to be recognised at a glance. This marked characteristic consists of a decided contraction immediately above the gastric region of the carapace, which causes the anterior portion, as far as the orbits, to assume a curious ear-like development. The first pair of legs are longer, and the remaining pairs shorter and more slender in proportion to the size of the animal, than those of the former species. The carapace is of a paler red generally than that of *H. araneus*, and is tinged on the underside with white; it is also tuberculated. The size of the animal is, on an average, very much smaller than that of the former species.

This species, as Professor Bell remarks, was discovered by Dr. Leach in the Firth of Forth. It is recorded, by Bell also, as occurring at Hastings, Worthing, Sandgate, Cornwall, Zetland, the Orkneys, the Loughs of Belfast and Strangford, and the coast of North Wales. We have obtained it from the Sussex coast, Milford Haven, and also from the Nore. Mr. Carrington found it abundant while trawling off the east coast in the North Sea. Those from the south coast, like *H. araneus*, are particularly clean and bright. It is also recorded as having been taken at St. Andrews, common; Plymouth; Shetland, the most common form of the higher Crustacea; Galway, common in ten fathoms; coast of Aberdeen; Moray Firth; and Berwick.

It is certainly very perplexing to understand the question of ova, as regards the Crustacea, for this species is an example of the difficulty as to date of spawning. For instance, we obtained specimens from the Channel on January 5th, 1881, with ova quite mature. We also obtained others from Milford Haven on April 22nd, 1881, with ova *not* mature. In the British Association Report for 1866 (p. 212) it is recorded in spawn in July, October, and November; whilst, according to Bell, Mr. Hailstone says it spawns in January. We can quite depend upon our own observations, which were carefully recorded at the time, and we have no reason to doubt those of other recorders. The ova much resembles that of the former species; they become very dark on approaching maturity.

Maia squinado (Latr.).

As this genus only comprises one British species, we will not refer to its generic features separately, but briefly describe the species at once.

The carapace of *Maia squinado*, unlike that of preceding species, is very rounded in form, not only laterally, but also dorsally. It is much covered with spines, the points of which are frequently worn round, no doubt by the animal crawling beneath rocks and between cleft ledges. The rostrum is somewhat similar to that of *Pisa*, but more divergent. The antennæ are small, the second and third joints being about equal in length. The legs are cylindrical and hairy, the anterior pair being much longer than the remainder. They, however, vary very much in length, some specimens having them much more developed than have others. *Maia squinado* has a remarkable habit of gathering its legs together in a very awkward-looking manner when handled, and if it can obtain a hold on—say a net—it is with difficulty that it can be removed. We have met with specimens that have at some time lost limbs, which have been in due course renewed, the fresh ones being about an inch long, while the carapace of the crabs were about six inches across. The disparity in appearance is very curious. The abdomen is seven-jointed, that of the male being, as usual, narrow, while that of the female is very broad—in fact, almost round—thus affording “cover” to masses of ova.

This species, though not so liable to the growth of extraneous forms as many others, is nevertheless not free from them. We have seen specimens completely encrusted with tubes of *Serpulæ*, small *Balani*, and young oysters, together with little tufts of Polyzoa. Others, again, of even larger dimensions, are perfectly free from such growth. Hence it follows either that the casting of the shell must take place at longer intervals than is generally supposed, or else that some specimens arrive at maturity in a diminished size, whilst others cast their exoskeletons and continue to grow to much finer proportions. The organic forms frequently met with on medium-sized specimens are not merely the result of a few months’ or a year’s development, but must have taken a much longer time. In Mr. Carrington’s cabinet is one evidently old specimen of this species, which is richly covered with short sponges, *Balani*, &c., with the addition of

half a dozen interesting little oysters (*Ostrea edulis*), of within the first year's growth. Another example in the same collection is comparatively clean, but on the carapace is a fine young oyster of between the second and third years of age. We think this conclusively proves that the change of exoskeleton is much more rarely, or possibly never, effected after a certain age.

Maia squinado is one of the largest of our English "crabs," and its size has therefore attracted attention to it as an article of food. It is "The Spider," *par excellence*, and is eaten in many localities, principally by the poorer classes, who almost invariably recognise it by the above name. Prof. Bell records an amusing incident to illustrate this; he also speaks of their being sold at Poole and also in Cornwall; in the latter they are known as the "Corwich." In Jersey, where they are called by the fishermen "pianne," they are largely caught, both in "pots" and also at low tide near La Rocque. We accompanied a fisherman on a visit to his pots, and took about sixty of these crabs, male and female in almost equal numbers, which he said was a fair "take" for about five and twenty pots. As this sort of thing goes on comparatively regularly, and has for generations past, the supply of *M. squinado* certainly seems remarkable. As regards the crab as an article of food, it certainly has the disadvantage of paucity of "meat," but the flavour is delicate and sweet, and in some opinions superior to that of *Cancer pagurus*.

Prof. Bell, in his work, quotes an interesting account, by Mr. Couch, of the early life of *M. squinado*, to which we would refer our readers; his description of the appearance of the ova is very correct, and his general observations most valuable as illustrating the early life-history of this interesting animal.

This species is fairly distributed, and may be said to be common, particularly on our southern shores. M. Milne-Edwards says, "it inhabits the Channel, the ocean, and the Mediterranean"; he also goes on to record a somewhat interesting mythological idea, namely, "The ancients considered it as having the gift of intellect, and represented it as hanging around the neck of Diana of Ephesus, as an emblem of wisdom. It is also put as an effigy on some of their medals."

It is common on the southern coast of Ireland, and also, according to the 'Natural History Review' (vol. iv. p. 152), at Galway. We are indebted to Mr. E. B. Kemp-Welch, of Bourne-

mouth, for the following remarkable observation:—"This species, though known to be common in Swanage and Studland Bays, immediately opposite Bournemouth, is scarcely ever thrown up on the beach at the latter place; but in July, 1875, an enormous number occurred, forming a little bank, and comprising many thousand specimens. Some of them were very large, and many in a soft state after change of skin. All were thrown up dead. I could never hear of any occurrence in the neighbourhood to account for this wholesale destruction. If it had been the result of submarine explosion or the like one would have expected to find other species, dead fish, &c., amongst them; but nothing besides *Maia squinado* was there, beyond the usual casual specimens that turn up on the beach. Nothing of the kind has happened since, to my knowledge."

Eurynome aspera, Leach.

This beautiful little crab terminates our British list of "spiders," or triangular carapaced Crustacea. It is an elegant species, and of a pleasing bright colour. Its carapace is usually about three-quarters of an inch in length and proportionately broad; it is extremely spinous and tuberculated, as also indeed are its legs. The rostrum is large in proportion to the size of the animal, and divergent; the anterior pair of legs are remarkably long, and the fingers are somewhat curved. The abdominal segments are carinated and tuberculated, those of the female being much broader than those of the male.

Prof. Bell remarks that this species is a deep-water one; it, however, is not entirely so, for we have obtained it fairly plentiful from the bays of the Channel Islands.

It has been recorded from St. Andrews, rare; Dublin, rare; Shetland, rare; Plymouth; Galway, common; Belfast; the Hebrides; Moray Firth; Isle of Man; Hastings; and the Cornish coast. So that it is very generally distributed.

The ova of this species present no particular feature; they are exuded about June, and are of the usual orange colour, becoming darker as the development of the enclosed zoëa proceeds.

The carapace being thick, and the size of the animal small, specimens may be dried without disarticulation, provided care be taken to keep them from the light of the sun or from too much heat.

(To be continued.)

OCCASIONAL NOTES.

THE MARTEN IN NORTH WALES.—The Marten seems so nearly extinct in many parts of the British Islands that its occurrence anywhere at a recent date is of interest. I therefore think it worth while to say that when on a driving tour in North Wales last June, I was stopping at the hotel at Bethgelert ('The Goat') for a few days, both on my way out and back. On the staircase were two stuffed Martens, which I was told had been killed near that place about five or six years before—perhaps the first might have been killed as much as seven years before I was there—but I could not arrive at the exact dates; one of them certainly looked as if it had been in its case some considerable time longer than the other. On making enquiries about these two, I was shown another, which had all the appearance of being a much more recent specimen than either of the others. This one I was informed had been killed about two years before, probably towards the end of 1879; but, as in the case of the other two, I could not get the exact date. One having been killed so recently as a year and a half or two years ago makes it very probable that the Marten is not yet extinct in North Wales. I do not remember any record of these two Martens, so think it quite worth while to send you this note of an animal which is probably on the verge of becoming extinct.—CECIL SMITH (Lydeard House, Taunton).

THE YOUNG OF THE PINE MARTEN.—With reference to Mr. Cocks' note (p. 333) I wish to withdraw my words, "never more than three," which were too hastily written. Although three is the usual number, I have known occasionally of four, and in one instance of five. I hope soon to have collected sufficient statistics for a short paper on the Pine Marten in Cumberland.—CHARLES A. PARKER (Gosforth, Cumberland).

MUS ALEXANDRINUS AT NORWICH.—A rat of this species was killed on board a wherry delivering maize at one of the wharves in Norwich, on the 13th August last. It is not unlikely this species is occasionally brought in grain-laden vessels from the Mediterranean ports, and, as in the present instance, mistaken for *Mus rattus*.—T. SOUTHWELL (Norwich).

[For some remarks on the occurrence of *Mus alexandrinus* in other parts of England, see 'Zoologist,' 1860, p. 7232, and 1878, p. 388. There is some ground for believing that this animal and the Black Rat, *Mus rattus*, are merely geographical races of one species, and that *Mus alexandrinus* is the oldest or parent breed. See Bell, 'British Quadrupeds,' 2nd ed., p. 306.—ED.]

BOTTLE-NOSED DOLPHIN IN THE COLNE.—On Sept. 5th a large porpoise was seen in shallow water near Brightlingsea, and was soon captured, after receiving, at a short range, a charge of shot just above and behind the left fin.

On inspection I find it answers to the description of *Delphinus tursio*. It is a female about nine feet long, and has twenty-three teeth in the upper jaw and twenty-one in the lower; they are more pointed than usual, and I therefore judge it to be a young specimen. A few years since I saw a larger one, also a female, that was caught off Harwich. I had an opportunity of examining the stomach of this specimen; it was empty, except that it contained many otoliths of cod and haddock.—HENRY LAVER (Colchester).

WHITE-BEAKED DOLPHIN AT YARMOUTH.—A very juvenile individual of this species, *Delphinus albirostris*, was landed at Yarmouth on the 10th September last; it was taken in the nets of a fishing-vessel about forty miles off the Norfolk coast. Its captors say that it died almost immediately upon striking the net, and that its mother which accompanied it swam round and round the boat for two hours, occasionally leaping quite out of the water in evident distress at the loss of its little one. In outline and coloration it very closely resembled Mr. Clark's figure (Proc. Zool. Soc., 1876, p. 679). Appearances indicated that at the time of its capture it had not long enjoyed a separate existence.—T. SOUTHWELL (Norwich).

SUPPOSED OCCURRENCE OF THE SOOTY SHEARWATER OFF CORK HARBOUR.—When in Dublin last July, my friend Mr. A. G. More showed me the specimen of the Sooty Shearwater (*Puffinus griseus*) that was shot off the Skelligs, on the Kerry coast, some years ago, and the occurrence of which he has recorded in the August number of 'The Zoologist.' While examining the bird, I was much struck with the sooty colour which extends all over the under parts, and it only then occurred to me that the two birds seen by me off Cork Harbour in August, 1849, and mentioned by Thompson in his 'Birds of Ireland' (vol. iii. p. 409), were of this species, and not the Greater Shearwater, as I thought at the time, and mentioned to him. He refers to the occurrence as follows:—"On the 24th of August, 1849, Mr. R. Warren, jun., when hake-fishing on the Maide, about three miles off Cork Harbour, saw two of the Greater Shearwater, which he remarked were easily distinguished from the *Puffinus anglorum* (of which numbers were seen on the same day) by their larger size and darker colour." These two birds appeared amongst the Common Shearwaters that were flying about amongst the fishing-boats at anchor, and frequently passed near our yacht, but not within shot, though the other Shearwaters came so close that I shot two fine specimens. When flying together the striking contrast of size and colour between the two species was very marked, the neat looking black and white plumage of *P. anglorum* contrasting favourably with the dark plumage of their dingy looking companions; and now when looking at an immature specimen of the Greater Shearwater (that I obtained some years ago on the

Mayo coast), seeing its brownish black and light-coloured under parts, scarcely a doubt remains on my mind that the two birds seen in August, 1849, were specimens of the rarer *Puffinus griseus*.—ROBERT WARREN (Moyview, Ballina).

RAVENS BREEDING IN CAPTIVITY.—The following is from a recent number of 'The Bazaar':—"It may be interesting to some of your readers to know that the Raven will breed in a domestic state. I have a fine young pair, which were hatched in March last, from a pair of old birds in possession of a gipsy, who has bred them from domesticated birds for the last ten years. They reared six young this season. He tells me that the hen makes her nest in an old box, and that the cock bird takes his turn on the nest. He lets the birds out in his yard at breeding time.—ELLIS S. HARRIS." The fact of Ravens breeding thus freely in confinement must, I think, be of unusual occurrence, but perhaps the experiment has not often been tried. Some years since I had a tame Raven which had his—or her, for I believe it to have been a hen—full liberty with uncut wings. This bird did not stray far from home; but, strange as it may appear, a second Raven was one day seen for some time hovering over the house. Ravens are now very scarce in this strictly preserved district, only an occasional straggler being seen or heard of; therefore this stranger must, in all probability, have come from a great distance, confirming the well-known vast powers of sight as well as of flight possessed by these birds, their range of vision being of course very much increased by the great elevation at which they soar. Ravens were formerly occasionally found breeding in this county, and within four or five miles of this place is a tree upon which a pair annually reared their young, and which was, I believe, carefully protected by the proprietor; but now, *tempora mutantur*, and Ravens, Crows, Magpies, Hawks, &c., are considered as vermin. Some young Ravens were many years ago taken from a nest at Gedgrave, near Orford, and conveyed to Leiston Abbey, a distance of not less than thirteen or fourteen miles, but the old birds, notwithstanding the distance, discovered and fed them.—G. T. ROPE (Leiston, Suffolk).

ORNITHOLOGICAL NOTES FROM THE ISLE OF WIGHT.—Since recording the occurrence last November of two Thick-knee Plovers in the Island (p. 260), I have heard of another being shot on the Nunwell estate, near Brading. Mr. Dimmick, the Ryde taxidermist, had a Pied Flycatcher, killed in the neighbourhood, brought to him in April; this being the second instance of its occurrence brought to my knowledge within a few years, it cannot be so rare a visitant to the Island as was supposed by Yarrell, who states that "Mr. Blyth had seen a specimen that was shot in the Isle of Wight." Having lately been asked to identify a bird shot near Ryde in January, 1880, it proved to be a female Black Redstart. The following

wildfowl were shot on the Solent last winter:—The Egyptian Goose, the Bean Goose, two female Mergansers, and three Shieldrakes. A Grey Phalarope was also procured near Ryde. I have been informed by Mr. Dimmick that a Peregrine Falcon was shot some time ago at Rowlands, a farm in East Medina, when making a stoop at a Pigeon set up as a lure. A few weeks since a Carrier Pigeon alighted on a dovecot in the town; inscribed on the inner web of a pure white feather of each wing is the following direction, clearly printed:—"Southern Counties Club, No. 243. Young." Few Swallows have been seen in the Undercliff this season, and they were late in appearing; one only observed up to April 28th. Martins, though late in arriving, are abundant. Nightingales have been plentiful; first heard on April 12th. Native songsters rarely met with, few having survived the severe winter. Mr. Rogers, naturalist, tells me that birds of the following species nested this summer in the Freshwater cliffs:—Peregrine Falcon, Raven, Shag, and Cormorant, besides the usual Gulls and other sea-fowl.—H. HADFIELD (Ilig Cliff, Ventnor, Isle of Wight).

JAY FEEDING ON OAK-GALLS.—I have been interested at seeing in 'The Zoologist' Mr. Frank Norgate's valuable contribution entitled "Notes on the Food of Birds" (pp. 321, 322). Amongst the varied articles mentioned he does not name one certainly fed on by some of our birds, *viz.*, oak-galls. Many years ago a relative who was a sportsman killed, to my regret, near Egg Buckland, Devon, some young Jays that had recently left the nest, when I found that the parent birds had been feeding them with the small round, semi-translucent galls so common on the leaves of the oak, but of the scientific name of which I am ignorant. Comparatively recently an instance of a bird having fed on another kind, also met with on the oak, was brought under my notice. The gall in this case was the very different one, with flat sides, commonly known as the "oak-spangle." Of these my brother found a great number in the crop of a Water Rail shot by a friend in the neighbourhood of Launceston, Cornwall.—T. R. ARCHER BRIGGS (Richmond Villa, Plymouth).

CHOUGH IN OXFORDSHIRE.—On the 8th of April last I examined a specimen of the Chough at our village birdstuffer's. It appears to be not fully matured, the legs being a reddish orange and the bill yellow; the latter seemed unusually short. On dissection I found it to be a female. The bird was in very good condition; the stomach contained the remains of several small beetles and one caterpillar entire, about an inch long. It was killed in Broughton Park, probably the same day that I saw it. This is, I believe, the first occurrence of the bird in the district, and I have no other record of its having been obtained in Oxfordshire.—OLIVER V. APLIN (Bodicote, Oxon).

[Possibly an Alpine Chough escaped from confinement.—ED.]

NOTES FROM THE FARNE ISLANDS.—In one of my Migration Schedules received from the Inner Farne Lighthouse (September 3rd), that excellent observer, Mr. Thomas H. Cutting, communicates, amongst many others, the following interesting notes:—A white Petrel was seen by several of the fishermen swimming near the island in the early part of March. The King Eider was seen again in the latter part of April, and was about the islands for two months; it was seen by Mr. Cutting on June 19th. A pure white Guillemot was seen several times in the months of June and July. Several pairs of Roseate Terns have bred on the islands this year. The Sandwich Tern first arrived on May 6th, the Arctic Terns on the 9th; they left again, almost to a bird, on August 21st. Several of the latter were seen again fishing near the island on the 26th.—JOHN CORDEAUX (Great Cotes, Ulceby).

ON THE ACCLIMATISATION OF THE EUROPEAN QUAIL IN NORTH AMERICA.—I lately saw a paragraph in an American newspaper to the effect that Quails imported from Messina had been successfully acclimatised in the state of Maine, but retained their migratory habits, going south in the autumn and returning to Maine in the spring. Can any correspondent of 'The Zoologist' supply additional information on this subject? I know no other instance of the artificial acclimatisation of a migratory species.—J. H. GURNEY (Northrepps Hall, Norwich).

SNOW BUNTING NESTING IN SHETLAND.—A Snow Bunting's nest with three eggs was found by a boy, on the 10th August last, in the island of Yell. The nest was built at the side of a corn-field in a tuft of docks and rank long grass; it is composed of coarse grass, lined with hair. The mother allowed herself to be taken rather than quit her charge, but the boy who took the nest was humane enough to give the poor bird her liberty. The eggs are in my collection, and any readers of 'The Zoologist' interested in Ornithology who may chance to visit Lerwick can see and examine the specimens.—J. T. GARRIOCK (Prospect House, Lerwick).

FOOD OF THE RING DOVE.—In addition to the varieties of food of the Ring Dove given by Mr. F. Norgate, in his "Notes on the Food of Birds" (p. 324), may be added the flowers of the charlock (*Sinapis arvensis*), unripe seeds of the cow-parsnep (*Heracleum sphondylium*), fruit of the wild rose and sweet-briar, turnip-seed picked from the freshly-sown drills, and gooseberries of all kinds, though the yellows are the favourites.—ROBERT WARREN (Moyview, Ballina).

GARGANEY AND SPOTTED REDSHANK IN CORNWALL.—There was shot on 8th inst., west of Penzance, a Garganey Duck, in the first year's plumage; and in the course of the week I procured from a game-dealer here a Dusky Redshank. Mr. W. H. Vingoe, of this place, saw both of these birds, and confirmed my identification of them.—T. CORNISH (Penzance).

LATE STAY OF SWIFTS.—Swifts have stayed very late with us this year. There were three nests, and I think four, or perhaps five, contained young in September, for I heard the young twittering when the old ones flew into the nests on September 3rd. I think they took their departure on the 5th. There were a good many flying about very busy, but to-day (the 6th) I have not seen one. I think it almost certain that they have hatched twice this year.—W. PURNELL (Henley-on-Thames).

THE PALMATED NEWT IN KIRKCUDBRIGHTSHIRE.—On the 2nd July last, when ascending Cairnsmore of Fleet, I was agreeably surprised to find the Palmated Newt (*Triton palmatus*, Dum. et Bib.) in abundance in a few bog-holes near the summit, at an elevation of over 2000 feet. I did not find them lower down the mountain, nor do I know of any other locality in this county where they occur. The holes in which I found them were quite shallow, and almost filled up with *Sphagnum* moss, through which the Newts had great difficulty in making their way. Compared with other species, these Newts appeared to me to be much more sluggish, and I had no difficulty in capturing as many as I wanted with my hand.—ROBERT SERVICE (Maxwelltown, Dumfries, N. B.).

ADDITIONS TO THE BRITISH FISH FAUNA.—In the exceedingly useful handbook of the 'Vertebrate Fauna of Yorkshire,' recently published, is a list of the British fish fauna, compiled from the most reliable and satisfactory authority. To this I should like to add the names of a few more species which have fallen under my observation:—

Gobius pictus, Malm. Mr. Alfred Walker, of Cherton, sent me a beautiful example which he had captured in Colwyn Bay, Wales, some years since.

Crystallogobius Nilssonii. In May, 1868, Mr. Edward, of Banff, obtained an example, which is referred to in the 'Life of a Scotch Naturalist,' pp. 375, 427. Having applied to Mr. Edward, he has been so obliging as to lend me his specimen, a fine male, which I have figured for my next number of 'British Fishes.'

Coregonus oxyrhynchus. In the Proc. Zool. Soc., 1877, p. 419, I noticed a British example. In March, 1880, I received from the late Mr. Frank Buckland one taken at Chichester, which was recorded at the time; as was also another in February, this year, from the Medway.

Mr. Gill considered a fish received from the West Indies, and named *Euxoymetopon taniatus*, to be identical with Hoy's fish, captured in 1812 off the coast of Scotland—a conclusion also arrived at by Dr. Günther

('Introduction to the Study of Fishes,' p. 435); whether following Gill or not does not appear. The editors have most correctly omitted this from their list, it being founded entirely on error. *Euxymetopon taniatus* with a smooth abdomen, no ventral, a perceptible anal and well-developed caudal fin, cannot be identified with a fish described as twelve feet nine inches long, no ventral (broken off) or anal, and no caudal; "but the thin edge of the belly was closely mucronated with small hard points, which, although scarcely visible through the skin, was very plainly felt all along it." Hoy's fish most unquestionably was Banks's Oar-fish, *Regalecus Banksii*, which has longitudinal bands of colour, also observed in the West Indian *Euxymetopon*.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

PORBEAGLE SHARK OFF PLYMOUTH.—On August 20th a small Porbeagle Shark, *Squalus cornubicus*, measuring three feet six inches in length, was caught off Plymouth with a hook and line, and brought to Mr. Hearder. On opening its stomach he found among its contents five large whiting-hooks, and three silver "spinners," two of the latter, strange to say, being marked with his own name, the third having no mark at all. The jaws of this fish were nicely prepared, and presented to Mr. Francis Day, who happened to be visiting Plymouth at the time of its capture.—JOHN GATCOMBE (55, Durnford Street, Stonehouse, Plymouth).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

August 3, 1881.—R. MELDOLA, Esq., F.C.S., &c., Vice-President, in the chair.

Miss E. A. Ormerod exhibited numerous specimens of Coleoptera and Hemiptera, in spirits, which had been collected by Mr. Bairstow in the neighbourhood of Uitenhage and Port Elizabeth, South Africa.

Mr. A. H. Swinton communicated some observations on *Iodis vernaria*, of which the following is an abstract:—This species is common on the Surrey Hills, and when in repose its wings hang limp and roof-shaped, with their exterior extremity rising above the head like a crest. This arrangement allows great vertical play to the abdomen, and much facilitates oviposition. On opening a box containing a living female, Mr. Swinton was surprised to perceive a most sickly smell of honey, resembling the scent of clematis blossoms (on which plant the larva feeds), but more pungent. He also observed small minute columns of emerald-green, attached here and there, which proved to be eggs, shaped like draughtmen, and piled up one on the top of another, in a slight curve, to the number of twelve or fifteen. The odour appeared to arise from the substance by which the eggs were

agglutinated together. The moth flies at early dusk, and rests amongst the clematis during the day. Specimens of the moth and eggs were exhibited in illustration.

Mr. E. A. Fitch exhibited an ear of wheat on which were between fifty and sixty skins of *Siphonophora granaria*, all of which, without exception, had produced an *Allotria* or *Aphidius*. He also remarked that from his observations in one particular field he should think quite 90 per cent. of the Aphides, which were numerous, were infested with these parasites.

Prof. Westwood communicated the "Description of a new genus of Hymenopterous insects" (*Dyscolestes canus*). The species, which is from Chili, is of somewhat doubtful affinities, but was thought to be an aberrant form of the *Formicidæ* or *Scoliidæ*.

Mr. A. G. Butler communicated a continuation of his "Descriptions of new genera and species of Heterocerous Lepidoptera from Japan," the descriptions of fifty *Geometræ* being included in the present paper.

Mr. R. Trimen communicated a memoir "On some new species of *Rhopalocera* from Southern Africa," six new species being described, from the extra-tropical region of South Africa.

Mr. C. O. Waterhouse communicated some "Descriptions of new Longicorn Coleoptera from India, Japan, and Africa."

Mr. W. L. Distant read the "Descriptions of some new Neotropical *Pentatomidæ* and *Coreidæ*"; also the "Description of the female sex of *Morpho Adonis*, Cram." In the discussion on this last paper Mr. Meldola and Mr. Kirby made some remarks on the occurrence of dimorphism in the genus *Morpho*.

September 7, 1881.—H. T. STANTON, Esq., F.R.S., &c., President, in the chair.

The Rev. A. E. Eaton exhibited a dried specimen of the nymph of a species of *Euthyplocia*, Etn., a genus of the *Ephemeridæ* known hitherto only in the adult condition.

Mr. E. A. Fitch exhibited a larva of *Zeuzera asculi*, from which many hundreds of a species of *Encyrtidæ* had emerged; these were also exhibited, and, considering their vast numbers from a single host, he thought it one of the most remarkable cases of parasitism that had come under his notice. The lepidopterous larva had been received from Miss R. M. Sotheby, of Eastbourne.

Mr. Fitch also exhibited many specimens of *Drosophila cellaris*, with their pupa-cases; these flies had been bred in a bottle of "Piccalilli" pickle, and were received from Mr. Charles Foran, of Eastbourne, with the following history:—"About three weeks since a bottle of Piccalilli pickles was opened, and a number of small white maggots were found feeding on every piece of pickle, which consisted mostly of cauliflower and cucumber,

thoroughly saturated with vinegar, mustard, &c.; these larvæ afterwards pupated on the cork, and from these pupæ the enclosed flies were bred." Mr. Fitch remarked that when this fly was exhibited at a previous meeting he thought a very ungenial habitat was assigned to it (Proc. Ent. Soc. Lond. 1877, p. xv; August, 1877), but one of which this exhibition was quite confirmatory.

Mr. Fitch also exhibited the following galls:—

(1) Galls of *Cecidomyia foliorum*, H. Loew, a species new to Britain, found near Grays, Essex, on 14th May last. These were small reddish galls on the leaves of *Artemisia vulgaris*.

(2) Galls of *Cecidomyia*? n.s., which were greatly enlarged flowers of *Galium Mollugo*, found at Dorking on 16th July last. Dr. Franz Löw found similar galls in Upper Austria, tenanted both by a *Cecidomyia* and a *Diplosis* larva, neither of which were identified, as the gall gnats were not bred (cf. Verh. z.-b. Ges. Wien. xxvii. p. 35).

(3) Galls of *Cecidomyia*? n.s. (*thalictri*, H. Loew), on the flowers and seeds of *Thalictrum minus* (*flexuosum*, Bab. Man.), found in some numbers a day or two ago by Dr. Power in Perthshire. Dr. Boswell had remarked that these galls were not uncommon on the *Thalictrum*, when growing inland, but curiously he could never find them on plants by the sea-side. The imago is unknown, but for a notice of the gall see Loew's Dipt. Beit. pt. iv. p. 30.

(4) A large woody gall on whitethorn picked that morning at Maldon, which Mr. Fitch considered to be quite new. It bore some resemblance to the woody sallow gall of *Cecidomyia salicis*, Schrank, specimens of which were exhibited for comparison.

Mr. Fitch likewise exhibited the extraordinary monstrous pupa of *Bombyx mori* referred to in this month's 'Entomologist' (Entom. xiv. 193), and read some remarks from Mr. E. Kay-Robinson, who had reared the specimen. Messrs. Stainton, Eaton, Waterhouse, and others made some remarks on the exhibit, but no satisfactory explanation of the apparent monstrosity was forthcoming. Also some stems of *Equisetum limosum*, in which the larvæ of *Dolerus palustris*, Klg., were feeding; this being of peculiar interest from the facts that no other insect was known to feed on *Equisetum*, and the economy of but one species of *Dolerus* (*D. hæmatodes*, Schk.) was previously known, although there are about sixty European species, many of which are amongst our commonest sawflies.

Mr. T. R. Billups exhibited the following six species of *Ichneumonidæ*, new to Britain, which he had taken this year;—*Pezomachus geochares*, Först., captured at Deal on April 18th; *Pezomachus xylochophilus*, Först., captured at Rainham, Essex, on July 11th; *Limneria litoralis*, Holmgr., captured at Woking, Surrey, on August 1st; *Monoblastus femoralis*, Holmgr., captured at Peckham on May 27th; *Lissonota linearis*,

Gr., captured at Weybridge on July 25; and *Lissonota anomala*, Holmgr., captured at West Wickham Wood on May 7th. The handsome *Pezomachus xylochophilus* had also been taken at Blundall, near Norwich, by Mr. Bridgman.

Mr. C. O. Waterhouse exhibited the larva of an *Æstrus* which had been taken from the side of a specimen of our common domestic mouse (*Mus musculus*), received from Peru, which was also exhibited. The *Æstrus* larva measured one inch by five lines broad at its widest part, and occupied almost the whole of one side of the mouse; when extracted its head was found towards the posterior legs of the mouse. Specimens of *Holochilus apicalis*, Peters, *Hesperomys caliginosus*, Tomes, and *Hesperomys olivaceus*, G. R. Waterh., all received in the same collection from Peru, were similarly attacked and one specimen of *Mus musculus* contained two larvæ of the *Æstrus*.

Mr. G. H. Verrall remarked that in Brauer's 'Monographie der *Æstriden*' there was no mention of any species living on the *Muridæ* (mice), but that in a later paper (Verh. z.-b. Ges. Wien. xiv. 891, pl. xxi. B) Brauer had referred to and figured a species of *Æstromyia*? whose larva had been found on a field mouse (*Arvicola arvalis*, Pallas), at Langenberg (Wurtemberg) by Prof. Hering, occupying quite a different position, however, to the specimen now exhibited.

Mr. H. T. Stainton exhibited two specimens of *Charæa graminis*, bred from the grass-feeding larvæ from Clitheroe by Mr. F. S. Mitchell, thus surely identifying the lepidopterous larvæ which occurred in such great numbers (cf. p. 349 ante). Mr. Fitch said *C. graminis* had also occurred as a "plague" in the Thuringian Forest this year, Herr Gutheil recording that from twenty-five to thirty specimens of the larvæ or pupæ were found to the square foot, making about seventy millions to the ninety acres affected (Ent. Nach. vii. 253).

Sir Sidney S. Saunders exhibited specimens of *Sarcophaga lineata*, Fall., another dipterous parasite on locusts in the Troad, whose larvæ, feeding internally on the adipose tissues of their victims, had powerfully contributed to clear a considerable tract of country from those which had escaped previous destruction in the egg by the *Callostoma*. Also specimens of *Chalcis minuta*, Fabr., which were bred from the *Sarcophaga* pupæ. The locust proved to be *Ædipoda cruciata*, Charp, several specimens of which were exhibited.

The President read a letter from the Colonial Office acknowledging the receipt of the report on the insect attacking locust-eggs in the Troad, and requesting that "Lord Kimberley's thanks be conveyed to the Society for this valuable report."

Mr. C. O. Waterhouse read the "Descriptions of some new Coleoptera from Sumatra." *Anomala* (*Spilota*?) *Curtisii* (*Rutelidæ*), *Macronota anceps*

(*Cetoniidæ*), and *Eutrachelus sumatrensis* (*Brenthidæ*), and exhibited specimens; also a specimen of *Clerota brahma*, Gestro, from Sumatra.

Mr. J. S. Baly communicated the "Descriptions of uncharacterized species of *Eumolpidæ*, with notices of some previously described insects belonging to the same family"; nineteen new species were described from various localities.

Mr. A. G. Butler communicated a "List of Butterflies collected in Chili by Thomas Edmonds, Esq." The very rich collection contained sixty-nine distinct species, and many interesting notes on the habits and history of the species were included.—E. A. FITCH, *Hon. Sec.*

NOTICES OF NEW BOOKS.

A Handbook of the Vertebrate Fauna of Yorkshire. By WILLIAM EAGLE CLARKE and WILLIAM DENISON ROEBUCK. 8vo, pp. 149. London: Lovell Reeve & Co. Leeds: R. Jackson. 1881.

ONE by one the counties of England are receiving the careful attention of naturalists residing within their limits, and it is our pleasing duty from time to time to notice the publication of the results of these investigations.

The latest addition to what may be termed "the *useful* Library of British Natural History," is the recently-published volume by Messrs. Clarke and Roebuck, the title of which is given above. Considering the area of the county, its physical aspect, and the large number of resident observers whose names have been for some time familiar to the readers of this Journal, it is not a little remarkable that Yorkshire has remained so long without a handbook of the kind now before us. That there was ample material for the purpose might be reasonably assumed; it needed only the energy and discrimination of some competent naturalist to collect and arrange it. This has now been done, and if the treatment of the subject, as it seems to us, be somewhat brief, it at all events bears the stamp of accuracy in its details, and has evidently been prepared with much care.

The introductory remarks on the physical aspect of Yorkshire are very instructive, and enable those who are but little acquainted with the county from personal exploration to form an excellent idea of its varied features. As some account is given

of its former aspect and condition, when a great portion of the county was either clothed with forest, or presented an interminable tract of wild and mountainous fell or rolling moorland, the reader is enabled to realise the changes which have taken place (through increased cultivation, the extension of railroads, and the springing up of manufacturing towns), not only in the outward appearance of many portions of the county, but also in the number and variety of the wild creatures inhabiting it, whose existence has been more or less affected by man's interference with their natural haunts.

A general summary of the Vertebrate Fauna of Yorkshire and of the British Isles shows that of 717 species recognised as British, 513 have been identified as occurring in Yorkshire and upon its coast, the majority of absentees consisting of about seventy of the rarer birds, twenty of the fresh-water, and eighty of the marine fishes. Extended observation and inquiry will no doubt tend to reduce the number of these absentees, and so render the proportion of Yorkshire Vertebrata, as compared with the total number of British species, much larger than has at present been ascertained.

Considering the present restricted range of the Wild Cat in Scotland, we were not prepared to learn that it was to be found in Yorkshire so late as 1840. Mr. Roebuck informs us that in the winter of that year the last Yorkshire specimen was trapped by Mr. John Harrison on his farm at Murton, near Hawnby. Other testimony confirms the opinion that the Hambleton Hills were the Wild Cat's latest haunt. There is no proof that it ever inhabited the Fells of the north-west, though in all probability it once existed there. The evidence of its former existence in South Yorkshire is confined to entries in the churchwardens' accounts at Ecclesfield of sums paid in 1589 and 1626 for the destruction of "wylde cattis;" and to a legend of doubtful origin of an encounter—fatal to both—between a Wild Cat and a man of the family of Cresacre at Barnborough.

The Marten, which was formerly abundant and generally distributed, is now extremely scarce in Yorkshire, and restricted to one or two localities.

The Badger has become very local, and much reduced in numbers; while the Polecat is said to be fast becoming extinct. The smaller mammalia seem to fare better, and it is satisfactory

to learn that that useful little creature, the Weasel, is allowed to be "universally distributed and abundant everywhere."

That tiniest of British quadrupeds, the Harvest Mouse, holds a place amongst Yorkshire Vertebrates, as does also the little-known Bank Vole, which is reported as occurring in a few scattered localities.

Early in the present century, it appears, Seals used to breed in numbers at the mouth of the Tees, and interfered to such an extent with the Salmon fishery that in 1802 determined measures were proposed for their extirpation. "There is no evidence," says Mr. Roebuck, "to show that their extermination was so effected, but it is hardly probable that they would long survive the rapid rise of the Cleveland iron trade and the shipping industries of Middlesborough, and in all likelihood the decade 1830 to 1840 would be that of the final extinction of the Seal as a permanent resident in Yorkshire, though solitary individuals have been observed to within the last twenty years."

Mr. Clarke has a very good account to render of the Birds of Yorkshire, and has rescued from oblivion many an interesting note of the capture or occurrence of some of the rarer species. As several of these records are printed for the first time, they will be the more acceptable to ornithologists. Nearly four pages are devoted to a history of the former existence in the county of the Great Bustard, which, having long ceased to be a resident in England, seemed to demand a more lengthy notice than could be well bestowed on other species.

Of the Reptilia, it appears that the Sand Lizard (*Lacerta agilis*) is absent from Yorkshire, or at least has not been observed there. This is the case also with the Smooth Snake (*Coronella lævis*), although the latter has been found much farther north in the neighbourhood of Dumfries. These two representatives of the orders *Lacertilia* and *Ophidia* affect similar haunts, and might well be looked for on the sandy heaths and extensive commons, where a light and dry soil would favour their existence. So far as we know at present, however, both species seem to be almost entirely confined to the southernmost counties of England. Amongst the Batrachians the Yorkshire list includes the three species of Newt; but *Rana esculenta*, the Edible Frog, is absent.

Out of fifty-three species of British Fresh-water Fishes, thirty-two have been identified as occurring in Yorkshire rivers

and streams ; while the enumeration of 116 out of 196 marine species testifies to the assiduous inquiries and investigations which have been made by the authors in the preparation of their useful Handbook.

Report on the Migration of Birds in the Spring and Autumn of 1880. By JOHN A. HARVIE BROWN, JOHN CORDEAUX, and PHILIP M. C. KERMODE. 8vo, pp. 120. London: Sonnenschein & Allen. 1881.

It will be in the recollection of our readers that in 'The Zoologist' for May, 1880, Messrs. Harvie Brown and Cordeaux published their first Report on the results of a scheme which they had organised the previous year for eliciting reliable evidence from trustworthy observers on the coast concerning the arrival and departure of migratory birds. By means of printed forms of inquiry and letters of instructions addressed to the keepers of lighthouses and light-ships on the East and West Coasts of Scotland, and the East Coast of England, they obtained a series of interesting observations which, being properly grouped and arranged, were embodied in the Report referred to. During the year 1880 the scheme was continued, the field of their labours was enlarged, and they were fortunate in securing the co-operation of Mr. Philip M. C. Kermode, of Douglas, Isle of Man, who undertook the collection of statistics on the West Coast of England. The result of their combined labours has just appeared in the shape of an octavo pamphlet of 120 pages, entitled as above, and reflects the greatest credit upon its authors. The continuous correspondence which the collection of these statistics has evidently entailed, and the time which must have been expended in transcribing and arranging them, betokens an amount of industry which none but the most zealous workers in Ornithology would have cared to bestow. It is to be hoped that these efforts in the cause of science will be properly appreciated, and receive the support of ornithologists throughout the country, so that, by means of the statistics thus carefully collected and summarised, we may some day arrive at a satisfactory solution of the many interesting questions which affect the subject of the migration of birds.

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THE ANNALS OF IRISH ZOOLOGY.

BY THE EDITOR.

CONSIDERING how wide a field of research lies open to the naturalist in Ireland, it is not a little remarkable how much that country in this respect has been neglected. In the case of nearly all the standard and more important works relating to the Zoology of the British Islands, it is apparent that by far the greater portion of the materials utilised in their composition have been collected and arranged from observations made in England. To this statement, no doubt, a few notable exceptions may be made, as in the case of such works as those of Macgillivray, Sir William Jardine, and William Thompson, of Belfast; but the fact remains that, as compared with the voluminous zoological literature relating to England, Irish records in this respect are very scanty. Under the mistaken notion that British Natural History is worked out, many English naturalists, anxious to find some new field for their labours, have travelled in distant lands and spent years in investigating the fauna of countries little known or little explored; until, through the medium of their publications, often splendidly and expensively illustrated, we have come to know more of the characteristic animals of the antipodes than we do of those by which we are, so to say, surrounded. It appears at least singular that a tolerably well-informed zoologist of the present day should experience no difficulty in supplying a list of Australian mammals, or Ceylonese birds, and yet be unable to decide, for instance, whether the Wild Cat, the Weasel, or the Harvest Mouse are

indigenous to Ireland, or how many species of Chiroptera are to be found there; whether the Black Grouse was ever a native of the Emerald Isle, or what is the distribution in that country, say, of the Crayfish. These examples, taken at random, and numerous other cases might be suggested, only serve to show that there are still questions relating to the fauna of Ireland which require investigation, and which it is a reproach to naturalists of the present day to leave unsettled.

When we consider that more than a quarter of a century has elapsed since the publication of what is generally regarded as the standard work on the Natural History of Ireland, it seems high time that steps were taken to furnish a more accurate view of the fauna of that country than is presented to us in the work referred to. Not that we regard Thompson's work as inaccurate in its details, so far as they go,—for it would be difficult to name a more careful or competent observer than he has proved himself to be,—but the researches of other naturalists in Ireland since the date of his publication have brought to light results which necessitate a modification of many of his statements, although the latter, no doubt, were true enough at the time they were made, so far as could be judged from the materials at command. The same may be said of some few writers who preceded Thompson in the same line of research, although the further back we go in the annals of Irish Zoology the more vague and indefinite is the information to be derived. This want of precision on the part of some of the earlier writers on Irish Natural History deprives their works, in a great measure, of that value which would otherwise attach to them. Nevertheless, as illustrating the progress of scientific research in Ireland, such works ought not to be overlooked by naturalists of the present day in any attempt to improve upon the labours of their predecessors.

In view of the foregoing reflections, it may be not altogether unprofitable to enquire who are the writers, either ancient or modern, who have contributed in any way to a knowledge of the fauna of Ireland, and what may be the value of their testimony.

The earliest notice, so far as is known, of the wild animals of Ireland is to be found in a tract, '*De mirabilibus Sacrae Scripturae*,' written by an Irish ecclesiastic, by name Augustine, about the middle of the seventh century. It is very brief, amounting, in fact, to only a few lines, but deserves at least a passing notice,

not only on account of the early date at which it was written, but because it contains a reference to the existence in Ireland of at least two animals which have long been extinct there, namely, the Wolf and the Wild Boar. The passage is as follows:—"Quis enim verbi gratia lupos, cervos, et sylvaticos porcos, et vulpes, taxones, et lepulos, et sesquirolos in Hiberniam deveneret."

In the '*Topographia Hibernica*' of Giraldus Cambrensis (A. D. 1183-86) we have the earliest work in which there is anything like a detailed account of the fauna of Ireland, and considering the date of its composition and the circumstances under which it was written, it must be allowed to be a highly creditable production. At the same time it must be borne in mind that Giraldus—evidently a very credulous man—wrote down not only what he saw and observed for himself, but what others told him upon mere hearsay report; hence there is much mingling of truth with fiction in his work. Again, his knowledge of the country must have been very limited, extending, it may be assumed, no further than the English occupation then extended, over considerable parts of Leinster and Meath, and small parts of Munster and Ulster.* Even supposing that he went everywhere where the English had established themselves, still by far the larger part of Ireland was altogether unknown to him, except by vague reports of his English friends or by very doubtful descriptions from the few Irish of the subjugated parts who would still remain on their lands in subjection to the English.

These circumstances, the too great credulity of the writer, and his limited acquaintance with the country through which he travelled, preclude us from attaching too high a value to his remarks on the fauna of Ireland. They are, nevertheless, too important to be overlooked in any memoir of the writers on Irish Natural History. To examine critically all that Giraldus has written on this subject would require a great deal more space than can be here devoted to it. It must suffice if we glance rapidly at some of the more interesting points upon which he has touched.

After some introductory chapters on the situation of Ireland and its physical aspect, the winds and rain with which it is

* His first visit to Ireland was in 1183; his second, in company with Prince John, in 1185.

visited, and so forth, we come to its natural productions; and one of the first passages which strikes us (cap. vi.) is a refutation of Bede's statement that the Roe-deer was a native of Ireland.* Giraldus says this is not the case, and to the present day no traces of this animal have been found there.

Noticing the marine and fresh-water fish (cap. ix., x.) he refers to three kinds not found elsewhere—that is, peculiar to Ireland:—“Sunt enim quidam truttis, quæ et salares [Salmon] dicuntur, longiores et rotundiores, albis carnibus confertis et sapidis; thymallis qui vulgariter umbræ [Grayling, or Umber] dicuntur, persimiles, nisi quod capite degenerant grossiore. Sunt et alii, marino haleci tam forma et quantitate, quam colore et sapore simillimi. Sunt et tertii truttis, nisi quod maculis carent, per omnia similes; primos ‘Glassanos,’ secundos ‘Catos,’ tertius vero ‘Bricios’ vocant.”

He adds that these three kinds were only met with in summer and never in winter; that is, they were migratory.

Passing on to the Birds (cap. ix. to xxiii.) he refers first to the falcons and hawks, for which Ireland in the palmy days of falconry was celebrated, noticing by the way that amongst birds of prey the female is generally larger than the male, and calling attention to the various phases of plumage which the Sparrowhawk undergoes, and to the different mode in which the short-winged hawks and long-winged falcons take their prey, all of which observations are found to be exact at the present day.

A long chapter on the Eagle (cap. xiii.) is followed by one on the Crane (cap. xiv.) a bird which, according to Giraldus, might be seen in large flocks in Ireland in his day. “In tanta vero numerositate se grues ingerunt,” he says, “ut uno in grege centum, et circiter hunc numerum, frequenter invenias.”

He repeats the story which says that the Crane is of so watchful a nature that a sentinel is always posted while the flock is at rest, and that the sentinel stands with a stone in one foot, so that in case he should fall asleep the fall of the stone would rouse him. The ancient legend, too, of the Bernicle Goose and its supposed generation from old sea-timber finds a place (cap. xv.)

* Bede, it may be observed, was never in Ireland himself, and his brief allusions to the *feræ naturæ* of the country were derived from hearsay. See ‘The Book of Howth,’ Brewer and Bullen, Calendar Carew MSS., p. 32.

amongst the stories collected by the too credulous historian, who in this instance appears to have sought some justification for his belief in the story in consequence of having seen with his own eyes some Barnacles clinging to a beam alongshore!

He describes the flight of the Osprey from his own observation (cap. xvi.), but credits it with some remarkable peculiarities of structure and habit, which shows that he could never have examined a specimen closely. Had he been able to do so, he would not have informed us gravely that this bird has one foot webbed, the other armed with talons, so that it may swim with the one, while it grasps its prey with the other. Some equally wonderful stories are related with regard to the Kingfisher, to which a chapter is devoted.

In the North of Ireland, we are told, wild Swans were common, but Storks very rare, and those black! The song of the dying Swan, as might be supposed, calls forth a passing allusion. The Hooded Crow is noticed as more common in Ireland than its black congener, and its habit of breaking open molluscs by letting them fall from a height in the air is briefly described. The Grey Shrike seems to have been not unknown in Ireland when Giraldus wrote. He refers to its habit of impaling beetles on a thorn.

With regard to species not found in Ireland, Giraldus states that in his day there were no falcons but Peregrines; no Gerfalcons, which came from northern regions; no Partridges nor Pheasants; and no Magpies. The Nightingale, which he tells us was never seen in Ireland, still remains unknown there.

Amongst the beasts of chase he includes Deer, Wild Boars (which were numerous, though small and ill shaped), Hares, and Martens, the last-named being very common in the woods.

The Badger is particularly noticed on account of a singular habit with which he is credited. According to report, apparently believed by Giraldus, a Badger when about to remove the soil which he has dug out from his burrow, lies on his back, taking as much as he can carry between his legs, and holding a bit of wood in his mouth is by means of it drawn out by his friends!

The Beaver is mentioned only for the purpose of showing that it was unknown in Ireland, though a few were said to be then still existing in Wales and Scotland. Amongst other *feræ naturæ* absent from Ireland, Giraldus includes the Roe-deer, Fallow-deer, Hedgehog, Stoat, and Polecat.

The Roe-deer, we know, was never indigenous to Ireland; the Fallow-deer was introduced. But when? Apparently not before the date of the 'Topographia Hibernica.' Its abundance at a later period we shall have occasion to notice presently.

The Hedgehog in all probability was overlooked by Giraldus, for it is known to be generally distributed throughout Ireland. This is the case also with the Stoat (marked "absent" by Giraldus), though not with the Weasel, which he characterises as numerous: "*Mustelæ hic multæ sed minutæ plurimum et sub-rufæ.*" This is curious, for at the present day it is still doubted by many whether the Weasel is really to be found in Ireland; an impression prevailing amongst naturalists that this name is bestowed upon the Stoat.*

The absence from Ireland of the Mole, as noted by Giraldus, is confirmed by modern investigations. Mice were said to abound and to do great damage.

It was apparently not enough to assert that no poisonous reptiles existed in Ireland, for Giraldus adds that none such could live there if imported from other countries; and further that the dust of Irish soil, if taken abroad, would be fatal to such reptiles! Frogs were occasionally to be met with, for he saw one which had been found at Waterford in 1179.

Here we must take leave of Giraldus, for at this point in his work he quits the domain of Natural History for the field of marvels and miracles, which, however curious and entertaining, can scarcely be regarded as pertinent to our present purpose.

Ranulph Higden, a Benedictine monk, of St. Werburg's Abbey, in Chester, who died at an advanced age about 1363, compiled a 'Polychronicon,' or Universal History, reaching to his own time, which was one of the most popular histories during the fourteenth and fifteenth centuries, and continued to be much in use during the following century also.

* Andrew Murray, in his 'Geographical Distribution of Mammals' (p. 114), says the Weasel *formerly* inhabited Ireland, but is no longer found there. Macgillivray states that it is generally distributed in Ireland, but Thompson says he never met with it there, nor does he consider that it has been proved to be a native, though it may be so. The Stoat, which is called Weasel in Ireland, is common there (Nat. Hist. Irel., vol. iv., pp. 6, 7). For positive evidence, however, of the occurrence of the Weasel in Co. Mayo, *cf.* Borrer, 'Zoologist,' 1877, p. 291.

In that portion of the work which relates to Ireland (vol. i., chapters xxxii—xxxvi., ed. Babington), the compiler, as might have been expected, has borrowed largely from the work of his predecessor, Giraldus. The nature of the information which he imparts, and which is often very tersely expressed, may be seen from the following extracts. To some readers, possibly, the quaint English translation by John of Trevisa might be more acceptable than the original Latin. But we prefer to quote from the latter, because John of Trevisa is not always literal in his translation, and in cases where he has evidently failed to identify an animal by its Latin name he has preferred to omit all mention of it rather than venture upon a translation which might possibly be erroneous. In some cases, moreover, where he has supplied an English name, he has malidentified the species. In an inquiry like the present it is important to note this.

Higden thus refers to the natural productions of Ireland:—
 “Terra hæc magis vaccis quam bobus, pascuis quam frugibus, gramine quam grano fecunda. Abundat tamen salmonibus, murænis, anguillis, et cæteris marinis piscibus; aquilis quoque, gruibus, pavonibus, coturnicibus, niso, falcone et accipitre generoso. Lupos quoque habet, mures nocentissimos; sed et araneas, sanguisugas et lacertas habet innocuas. Mustelas quoque parvi corporis sed valde animosas possidet. Habet et aves quas ‘bernaces’ vocant, quas ancis silvestribus similes de lignis abietinis quasi contra naturam natura producit. * * * *
 Item Beda dicit caprorum venatu insulam fere insignem, cum tamen constet cum semper capreis caruisse. Nec mirum; cum Beda nihil de hac insula oculis suis cognoverit sed per relatores audierit.” *

Of the *feræ naturæ* absent from Ireland, Higden writes:—
 “Desunt hic degeneres falcones quos laniarios [Lanners] vocant, desunt et gyrofalcones, perdices, phasiani, picæ et philomelæ.

* It is possible that by “venatu caprorum” Bede did not intend to refer to the chase of the Roe-deer, as Higden and his translator have assumed, but to the Wild Goat, which in some parts of Ireland is still to be met with at the present day. In Achill, as we have lately been informed by Mr. R. Payne Gallwey, Wild Goats still abound, and, from the inaccessible nature of the cliffs which they frequent, as well as from their natural wildness, they are almost unapproachable even with a rifle.

Caret quoque capreis et damis [Fallow-deer] hericiis [Hedgehogs] putaciis [Polecats] et talpis [Moles] et cæteris venenosis."*

He then refers to the absence of venomous reptiles from Ireland, and to the tradition that all such creatures were banished from the country by St. Patrick, as well as to the popular belief, as noticed by Bede and Giraldus, that the dust of Irish soil, even if transported to other lands, was a preservative against the attacks of poisonous reptiles.

If we refer briefly, in passing, to the works of Campion,† Holinshed, and Camden, it is rather for the purpose of showing that they have not been overlooked than because they contain anything of importance bearing on the present inquiry; the fact being that each one of these writers has retailed, in his own way, information regarding the fauna of Ireland evidently borrowed from Giraldus Cambrensis and Ranulphus Higden.

'The Description of Ireland,' written by Fynes Moryson,‡ who was Secretary to Lord Mountjoy when Lord Deputy of Ireland (1599—1603), possesses more originality, and contains some few passages of interest.

¶ After noticing the Irish Wolf-dogs "of great stature" (vol. ii., p. 367), the abundance of Wolves "whose destruction being neglected by the inhabitants, oppressed with greater mischiefs, had so grown in number as sometimes in winter nights they would come to prey in villages and the suburbs of cities," he thus refers to the Deer, both Red and Fallow, which were then preserved by certain noblemen in Ireland, and it would appear from his remarks that the Fallow-deer at that date had been only recently introduced:—

"The Earl of Ormond, in Munster, and the Earl of Kildare, in Leinster, had each of them a small park enclosed for *Fallow-*

* John of Trevisa here translates *hericiis* "iles piles," omits *putaciis*, and renders *talpis* "wontes." "Want" or "Wont" is a provincial name for the Mole, still used in several counties. Cf. Ray, Dict., and Merret's Pinax, p. 168.

† A Historie of Ireland, written in the yeare 1571, by Edmund Campion, sometime Fellow of St. John's College in Oxford.

‡ An History of Ireland from the year 1599 to 1603; with a short narration of the state of the Kingdom from the year 1169. To which is added a Description of Ireland. By Fynes Moryson, Gent., Secretary to the Lord Mountjoy, then Lord Deputy. 2 vols., 8vo. Dublin, 1735.

deer, and I have not seen any other park in Ireland, nor have heard that they had any other at that time. Yet in many woods they have many *Red-deer* loosely scattered, which seem more plentiful because the inhabitants used not then to hunt them, but only the governors and commanders had them sometimes killed with the piece. They have also about Ophalia and Wexford, and in some parts of Munster, some *Fallow-deer* scattered in the woods: yet in the time of the war I did never see any venison served at the table, but only in the houses of the said Earls and of the English commanders."

At the present day, the *Red-deer* which still roam through parts of Kerry are descendants of the original wild stock, although fresh blood has now and then been introduced by Lord Kenmare and Mr. Herbert of Muckcross. These deer are now numerous and strictly preserved by the above-named proprietors, whose lands adjoin. The weight of the heaviest stag killed on the Muckcross Estate was $31\frac{1}{2}$ stone, and several have been found to average from 28 to 30 stone.

In the West of Ireland at the present day *Fallow-deer* roam in a wild state through many districts, descendants of animals which have long since escaped from parks or other enclosures. In Galway and Clare, and even across the Shannon, as we are informed on good authority, every large cover holds a few *Fallow-deer*. During the spring they issue at night from the woods and uplands, and make sad havoc amongst the neighbouring crops.

But to return to Fynes Moryson. "Ireland," he says, "hath great plenty of Birds and Fowls, but, by reason of their natural sloth, they [the inhabitants] have little delight in birding or fowling. But Ireland hath neither singing Nightingal, or chattering Pie,* nor undermining Mole, nor black Crow, but only crows of mingled colour such as we call Royston Crows. They have such plenty of Pheasants as I have known sixty served up at one feast, and abound much more with Rails, but Partridges are somewhat rare. There be very many Eagles and great plenty of Hares, Conies, Hawks called Goss-hawks, much esteemed with us, and also of Bees, as well in hives at home as in hollow trees

* The Magpie, as will be seen later, is said to have been introduced into Ireland in James the Second's time.

abroad, and in caves of the earth. * * * The hawks of Ireland called Goss-hawks are (as I said) much esteemed in England, and they are sought out by money and all means to be transported thither."

On the subject of Reptiles he says:—"I may not omit the opinion commonly received that the earth of Ireland will not suffer a snake or venomous beast to live, and that the Irish wood transported for building is free from spiders and their webs. Myself have seen some (but very few) spiders, which the inhabitants deny to have any poison, but I have heard some English of good credit affirm by experience the contrary."

In the Commentary of Peter Lombard, '*De Regno Hiberniæ*,' 1632, we find but a brief allusion to the Natural History of Ireland in the chapter "*De generibus animalium tam mansuetorum quam ferarum*," and even in this there is no great originality, the author quoting freely from the older works of Bede and Giraldus. After naming deer, for which Ireland was celebrated, wild boars, wolves, foxes, hares, and rabbits, of which there was a great store in his day, he especially refers to the Marten (p. 99), and to the value set upon its fur: "*Præcipue martes*," he says, "*quorum pelles plurimum æstimantur, et in universum in animalium pellibus magna pars est sita divitiarum hujus regionis*."

Irish Marten-skins seem to have been formerly much sought after. In Charles the First's time Lord Deputy Strafford, in a letter to Archbishop Laud, dated Dublin, 27th November, 1638, wrote:—

"Before Christmas your Lordship shall have all the Marten skins I could get either for love or money since my coming forth of England, yet not to the number I intended. The truth is that as the woods decay, so do the Hawks and Martens of this kingdom. But in some woods I have, my purpose is by all means I can to set up a breed of Martens; a good one of these is as much worth as a good wether, yet neither eats so much or costs so much attendance; but then the Pheasants must look well to themselves, for they tell me these vermin [*i. e.*, Martens] will hunt and kill them notably. Perchance you think now I learn nothing going up yonder amongst them into the forests and rocks."*

* Strafford's '*Letters and Despatches*' (1638), vol. ii., p. 249.

Amidst all the cares and anxiety of his responsible position, this same Lord Deputy found leisure to kill an Irish deer now and then. Writing from Coshawe, Co. Galway, to the Archbishop of Canterbury, in May, 1638, he says : *—"To say the plain truth, whether we shall have a Government or no, and to the intent that I might be the better 'in utrumque paratus,' at this present I am playing the Robin Hood, and here in the country of mountains and woods hunting and chasing all the outlying Deer I can light of; but to confess truly, I met with a very shrewd rebuke the other day; for standing to get a shoot at a Buck I was so damnably bitten with midges [he was addressing an Archbishop, too!] as my face is all mezled over ever since, itches still as if it were mad; the marks they set will not go off again, I will warrant you, this week. I never felt or saw such in England; surely they are younger brothers to the moskitoes the Indies brag on so much!"

From the titles of Dr. Gerard Boate's works,† it might be expected that they would contain some account more or less important of Irish Vertebrata; but the inquiring zoologist who turns over their pages with such expectations will be certainly disappointed. It may be well to note here that these works relate chiefly to the physical aspect of the country, its hills, woods, bogs, lakes, and rivers; mines and minerals; natural curiosities and antiquities.

We will quote but one passage to give an idea of the writer's style, and of the kind of information imparted. It occurs in the second of the books named (p. 192), amongst the natural curiosities, and relates to the Brent Goose, misnamed by Boate the "Barnacle":—

"Barnacles," he says, "are of the Wild Goose kind, and, like them, migrate from foreign countries to Ireland; they commonly come into Ireland in August, and leave it about March; their taste is very different, according to the places where they feed; in most places they are so rank that no curious palate can dis-

* 'Letters and Despatches' (1638), vol. ii., p. 173.

† 'Ireland's Natural History,' by Dr. Gerard Boate, 12mo, London, 1652; and 'A Natural History of Ireland,' in three parts, by Dr. Gerard Boate, Thomas Molyneux, M.D., F.R.S., and others, 4to, Dublin, 1726.

pense with such unsavoury food, but in other places they have a most delicious relish, rather better than either a Wild-duck, Teal, or Snipe. This is the case of the Barnacles at Londonderry and Wexford, and I hear the same concerning those at Belfast: the difference, I understand, arises from the food. At Londonderry, in the bay commonly called Lough Foyle, there grows a grass that sends out a stalk about a fathom long; the root of this is white and tender, and continues such for some space above the root, and 'tis almost as sweet as a sugar-cane. The Barnacles dive to the bottom, and lay hold on it as near as they can to the root, and pull it up with them to the surface of the water, and eat the tender part of it; the rest they let drive with the wind to the shore, where it lies in great heaps, and when rotten is good manure for land; and from this sweet grass, 'tis supposed, proceeds the sweetness of their flesh. They are taken by nets, set in proper places on the shores. 'Tis observable that the Divers and Widgeons, which are very rank and unsavoury elsewhere, undergo the same change of their flesh when they feed in this place."

This habit of the Brent Goose, as noticed by Dr. Boate, explains the origin of the old northern name "Rotgaus" (*i. e.*, Root-goose), applied to it both by Willughby and Pennant, neither of whom, however, give the explanation. The word occurs in the 'Durham Household Book' under date 1534, thus: "Feb. 3. Item, one 'Rutgoys,' 3d; one Mawlert [mallard], six Dunlings,* 2d.; one Seepye, 1d."

In O'Flaherty's 'Chorographical Description of West or H-Iar Connaught,' written in 1684, we have the following brief account of the fauna of that part of Ireland:—"The land produces wild beasts as wolves, deere, foxes, badgers, hedgehogs, hares, rabbits, squirrells, martens, weasels, and the amphibious otter, of which kind the white-faced otter is very rare. It is never killed they say but with the loss of man or dog, and its skin is mighty precious. It [*i. e.*, the country] admits no rats to live anywhere within it except the Isles of Aran, and the district

* Does not this orthography suggest the origin of the word, *i. e.*, "the little dun thing?" Compare the diminutives, Titling, Duckling, Gosling, &c.

of the west liberties of Galway.* The water streames, besides lampreys, roches, and the like of no value, breed salmons (where is recourse to the sea) eels and divers sorts of trouts. There was never a pike or bream as yet engendered in all this countrey, nor in the adjacent parts of Mayo or Galway counteys. The sea here is plentifully stored with fish, as cods, lings, hawkefish, coalefish, turbets, plaisses, hadogs, whittings, gurnards, macrells, herrings, pilchards, &c.; and no less liberall of shell-fish as oysters, scollops, cokles, muscles, razures, together with lobsters, crabs, shromps, &c. It now and then casts ashore great whales, gramps, porcupisses, thunies. Both sea and land have their severall kinds of birds. Here is a kind of black Eagle [*Aquila chrysaëtus*] which kills the deere by grappling him with his claws and forcing him to run headlong into precipices. Here the Ganet soars high into the sky to espy his prey in the sea under him, at which he casts himself headlong into the sea, and swallows up whole herrings in a morsell. This bird flies through the ships sailes piercing them with his beak. Here is the bird engendered by the sea out of timber long lying in sea. Some call them 'clakes' and soland-geese, some puffins, others bernacles, because they resemble them. We call them 'girrinn.' I omit other ordinary fowl and birds, as bernacles, wild geese, swans, cocks of the wood, and woodcocks, choughs, rooks, Cornish choughs with red legs and bills, &c. Here is fowle that custom allowed to eat on fasting days, as Cormorant feeding only on fish; as alsoe birds found in the high cliffs and rocks of Aran, which never fly but over the sea, which with all other numerous sea birds, yield a great store of feathers."

* The Editor (J. Hardiman), in a foot-note (p. 10), remarks upon this statement, in 1848:—"This is not the case at present. The Norway rat everywhere prevails, having nearly extirpated the little Irish black rat. The latter was the species mentioned by Giraldus Cambrensis in the following passage:—'Est et aliud ibi (*i. e.*, in insula Aran in occidentali Connactiæ solo posita) notabile; quia cum per totam Hiberniam copiose nimis mures abundant, hæc tamen insula mure caret.'"

REMARKS ON THE BREEDING OF CERTAIN
WATER-FOWL IN CONFINEMENT.

BY CECIL SMITH.

BOTH my father and myself having for a good many years kept ornamental water-fowl on the pond here, and having been tolerably successful in getting them to breed, I think a few notes on the various species which have bred here may be interesting. My experience, though extending over a good many years, has been far less than that of Mr. Sclater, who lately published in the 'Proceedings of the Zoological Society,' a paper on the breeding of various species of *Anatidæ* in the Zoological Gardens, Regent's Park. I propose, however, to give the names of the various ducks and gulls which within my memory have been kept and bred in this pond, either in my father's time or my own, and to add a few notes.

Taking the same order with the *Anatidæ* which Mr. Sclater has done, I begin with the Egyptian Goose, *Chenalopex ægyptiaca*, which bred freely, not only in this pond but on those of some of our neighbours, especially at Sandhill and Cotheleston, which at last I think led to my father's stock becoming extinct, for he did not pinion the young, which, being able to fly, paid occasional visits to their relations. At the latter place they gave great offence to the farmer who rented some grass-fields near the pond, and who eventually persuaded his landlord to have them shot, observing that "three of them things did eat as much as a sheep." My father's flock shared the fate of their relations, and consequently soon became extinct. I have one pair now, but as I only got them late this summer I am not yet able to say whether they will breed or not, but I do not think there is much doubt about it.

Of the Pink-footed Goose, *Anser brachyrhynchus*, Mr. Sclater says, it has "never, so far as I am aware, bred in confinement, although eggs were laid in St. James's Park." With me, however, they have bred rather freely. I first had a pair in 1871, and they laid their first egg on May 2nd, 1872. On this occasion they laid six eggs, three of which were hatched, though only one of the young ones reached maturity. In 1873 the same pair bred again, the first egg being laid on April 27th, but this time they had bad

luck, some of the eggs being sucked by rooks, and the young which were hatched being killed by rats as soon as they were born. In 1874 the young were hatched May 28th, and were soon able to walk about, as the next day the old birds brought their young ones down from the pond, on the banks of which they were hatched, to the one nearest the house. In this year four eggs were hatched out of five, though three of them were rolled into the water the day after they were sat, and I do not know how long they were in the water before I took them out. I have so frequently been unlucky in having eggs sucked by rooks that this year I took the eggs away, and only replaced them when the old bird began to sit. Since this time both the original pair and their offspring have bred regularly every year, though this year, partly owing to my being away, only one young one has been reared. As I mentioned, both in 'The Zoologist' for 1875 and in Mr. Dresser's 'Birds of Europe,' some of the young birds have orange legs and feet, and what ought to have been the pink part of the bill is orange. This was the case with the first bird reared and with the only one reared this year, though in no other respect do they differ from their orange-legged parents.

The Bernicle, *Bernicla leucopsis*, has never bred here, though for almost as long as I can remember there has been a pair of these birds on the pond. Mr. Sclater, however, states that it "breeds freely in captivity." This has not been at all my experience, and although it is mentioned as occurring in the earliest lists of the birds in the Gardens (1833), he only cites one instance of its breeding there, May 23rd, 1848, when young ones were bred.

The Canada Goose, *Bernicla canadensis*, bred freely on the pond in my father's time, as they did in some neighbouring ponds, but were killed at the same time, and for the same reason, as the Egyptian Geese, and I have never renewed the stock, as they are rather larger birds than I care to have.

I have a pair of Brent Geese, *Bernicla brenta*, now on the pond, but they have not shown any inclination to breed. This is the first year, however, I have tried them.

A pair of Common Sheldrakes bred here regularly for some years in my father's time, but he never had the young ones pinioned, thinking they were so tame that they would stay; but they never did so after the following spring. I have now only

one pair in the pond, and the female has regularly nested and laid for the last three years; but she has not been wise in her choice of a place for making her nest, for instead of choosing a rabbit's hole, as the old pair always did, she has chosen a dark corner of an outhouse which I generally use for keeping mangolds in during winter. Soon after the mangolds are all gone, in the spring, she takes possession of the darkest corner to make her nest in, and the eggs have always been taken or the young killed by rats. The young are by no means difficult to bring up, and if left with their parents, who are much better mothers than the common Wild Ducks ever are, may usually be successfully brought up. At many of the farm-houses near the coast young Burrow Ducks are brought up with the ordinary tame ducks.

Both my father and I have always had Widgeon, *Mareca penelope*, on the pond ever since I can remember, but they never bred till 1872, when, on the 27th June, they brought out their first brood, as recorded by me in 'The Zoologist' for that year (p. 3244), and they have bred regularly ever since; but as I do not catch the young ones and pinion them, they generally depart in the following spring—that is, those which do not fall victims to the Herring Gulls in their earlier days, for these gulls are terribly destructive to all young wild-fowl as well as to eggs.

Both my father and myself have frequently kept Pintails, *Dafila acuta*, on the pond; but though both male and female cross readily and constantly with the Wild Ducks, I have never known them behave as they ought and breed together.

Wild Ducks, *Anas boschas*, have bred regularly ever since I can remember. The first eggs are always laid about the middle of March, showing that the 1st of March is by no means too soon for the close time to begin. The only dates of hatching I have are—1864, April 13th; 1865, April 12th; 1866, April 28th (the latest I have); 1876, April 16th; and 1878, April 14th. In other years I have missed taking a note of the appearance of the first brood, owing to absence from home or some other cause; but I have notes of Wild Ducks sitting hard which would correspond very closely with the above dates of hatching. With one exception (April 24th) Mr. Sclater's dates are all later than mine, being all in May. I remember that, when I was a boy, one or more Wild Ducks always nested on a garden-wall fully twelve feet high, but

how they brought the young ones down I never could find out. The wall has been pulled down for a great many years, so I have no chance of seeing them brought down from there. One or two, however, nest every year in the ivy on a low wall near the pond, from which the young must be brought down by the mother, so I hope to witness the performance some day; but it is done almost immediately after hatching, as I have never found young in the nests on the wall. One day the old duck would be sitting hard and no young hatched; the next day there would be only the egg-shells in the nest, and the young would be swimming about with their mother in the pond.

Though there has always been ever since I can remember a pair of Tufted Ducks, *Fuligula cristata*, on the pond, they have never bred or shown the slightest disposition to do so.

There have always been a pair or two of Pochards, *Fuligula ferina*, on the pond ever since I can remember, but they only once nested and hatched a brood—namely, on the 12th May, 1872. (See Zool. 1872, p. 3243.) This brood, which consisted of four young ones, one other being left dead in the nest, I am sorry to say, did not survive long, for on the next day, the 13th, they were washed down one of the waterfalls in a flood, and all drowned but one, which I fished out and returned to its mother. During the time the young were alive the mother beat off the old drake, and would not let him come near her or her brood; but when she thought all the young were lost she took to the drake again. When I found and restored to her the one which was still alive she immediately took to it and beat the drake off again; the young one, however, did not live long, some accident having happened to it. Since that time the Pochards have never brought out a brood; the hen bird has laid and begun sitting, but accidents have prevented her hatching, partly because she has never made such a judicious choice of a nesting-place. The Pochard is the last on my list of the ducks which I have been successful in breeding from.

With the gulls I have also, to a certain extent, been successful. A pair of Herring Gulls, which I caught in Sark before they could fly, in June, 1866, nested and hatched their first young on the 14th June, 1873, having only attained their fully adult plumage that year. Since then they have laid regularly, and frequently been successful in rearing the whole or part of their brood. They

generally lay about three eggs, but if anything happens to the first ones they lay again. They are rather restless sitters and very anxious about their eggs, having found out that the Rooks are constantly on the look out to suck them, and are often successful if both leave the nest, for a few moments even, to feed; so now they seldom both leave the nest together, one always remaining either on, or close by, the nest after the first egg is laid. They always choose the same place at the foot of the stump of an old walnut tree which was blown down some years ago, the stump having been left standing for them.

Two Lesser Black-backed Gulls were sent to me from Alderney in July, 1879, almost in the down and quite unable to fly. They are, I suppose, both females, as they have not paired with each other; but in May, 1880, by which time they had both assumed fully adult plumage, one of them paired with an adult male Herring Gull. She laid three eggs, but only one was hatched. The young bird was just able to fly by the 30th July, when we caught it and cut its quill-feathers, but unfortunately did not pinion it. At this time it was impossible to distinguish it from a young Herring Gull of the same age. Owing to a long absence from home, I found this bird and the young Herring Gull of the same age able to fly well, and it was quite impossible to catch either of them. Both remained here, however, till May of the present year; but at that time it was almost impossible to tell which was which. The only difference I could see was in the colour of the legs, those of the cross-bred bird showing more inclination to yellow than those of the young Herring Gull, which were then nearly the pale flesh-colour of the adult. While I was away both took their departure; but one of them, the young Herring Gull, constantly returns, sometimes remaining several days at a time and sometimes departing immediately after feeding time, and not making his appearance again till feeding time the next day; but I am afraid the cross-bred bird has entirely disappeared. This practice of dropping in at feeding time and remaining a long or short time, as may happen, has been adopted by several other Herring Gulls this year. Some of them may have been bred here and gone away, but one of them is certainly an entire stranger, as he is a young bird of the year, and my tame ones this year were unfortunate, and did not rear the only one which was hatched. Some of the others are, I think, also quite strangers,

although they are all quite as tame as the old ones, and, having the advantage of being able to fly, get much the best of the scramble for food. Lately four have been in constant attendance, and as they are all of different ages they make a very interesting group, showing the various changes of plumage, the youngest being the bird of the year, and the oldest just assuming adult plumage, which will be complete this moult.

I have not been so successful with the Common Gull, *Larus canus*, as with the Herring Gull, for although they have frequently nested and laid eggs they have never been lucky enough to hatch them, partly owing to Rooks and Herring Gulls, both of which are constantly on the look-out to suck their eggs, and are frequently successful.

The little Black-headed Gull, *Larus ridibundus*, has never attempted nesting nor laid eggs, though I have had a good many of these birds on the pond for some time. They go through their regular changes of plumage, assuming their black heads about February, and now (at the end of September) they have completed their winter plumage.

ON THE OCCURRENCE IN SCOTLAND OF THE BLUE-THROATED WARBLER.

BY J. A. HARVIE BROWN, F.R.S.E., F.Z.S.

ON the 24th September of the present year I received a box containing three birds which were captured during the two previous days at the lantern of the Isle of May lighthouse, in the Firth of Forth, and which the reporter, Mr. Joseph Agnew, head lighthouse-keeper, desired to have named. One of these was a Nightjar, *Caprimulgus europæus*, a species hitherto unknown at this station; another was an adult male Redstart, *Ruticilla phœnicura*; and the third is the subject of this notice.

Along with the box of birds Mr. Agnew sent me the third fully filled-in schedule which I have received from him for 1881, and I cannot pass on here without testifying to the intelligent interest and careful attention which is manifested in these schedules. At the same time I am glad to testify in like manner to the general interest created by the Abstract of our Report on

Migration read at the last meeting of the British Association, and by the distribution of this Report to the various lightship and lighthouse stations in England and Scotland. We have to thank the Trinity House for the liberal view they have taken of the work, and for relieving us of much expense in connection with it.

According to Mr. Agnew's schedule, under date Sept. 17th, the wind was light westerly with haze. The next record occurs on the 22nd, the date of the capture of this specimen and of numerous arrivals of Redstarts, Mavises, Swallows, Golden Plover, Ring Dotterel, Lapwings, Chaffinches, one Corn Crake, one Robin, Curlews, &c.—indeed of a “rush” of migrants. On that day, and for some days previous, the wind was strong S.E., and it continued so all day: “weather, very thick haze, approaching to fog, with a continuous downpour of rain.” Mr. Agnew adds, “All the birds seen to-day seemed perfectly bewildered.”

The bird of which I now speak is *Cyanecula Wolfi*, or the white-spotted—sometimes spotless—form of the Blue-throated Warbler. The other form, *Cyanecula suecica*, or Red-spotted Bluethroat, is more northern in its range in Europe than the bird under consideration, and hitherto, with one exception, is the only species or form of the genus which has been recorded in Great Britain. *Cyanecula Wolfi* is found over Central Europe, and breeds in Holland, Germany, and southward, and is found in winter in Spain, Italy, and the shores of the Mediterranean (*vide* Dresser's ‘Birds of Europe,’ vol. i. p. 312), and according to Prof. Newton (Yarrell, 4th ed. vol. i. p. 324) has only once before occurred in Britain (*vide* Hadfield, Zool. 1866, p. 172, where the bird recorded as “Blue-throated Warbler” belongs to this form). The specimen in my possession closely agrees with the bird figured in Dresser's ‘Birds of Europe’ (vol. i. pl. 50), of which he says (p. 320), “a male of *C. Wolfi* in rather peculiar autumn plumage.” I have now, therefore, to record the second occurrence of the white-spotted form (which two Dresser unites under *Cyanecula Wolfi*) in Britain, and its first occurrence in Scotland.

Now, in connection with the distribution and rare occurrences of European or other species in Britain, I wish here to say a few words. In 1875, on the 10th November, I obtained a Black Redstart, *Ruticilla titys*, at Kincardine-on-Forth, which was duly recorded, and the specimen exhibited, at the Royal Physical

Society's meeting in Edinburgh, on the 21st February, 1877. At that time I said, "What we have for a long time considered as accidental—purely accidental—occurrences of continental species ought, in many instances, I think, rather to be held as indications of extension towards the north of their breeding limits on the Continent." Since then, as I will show, I have somewhat modified this opinion, as I think, besides such occurrences being partly due to northern extension of the breeding range, they are also due to prevalence of easterly and south-easterly winds and gales blowing the migrants more to the northward than in other circumstances they would be borne. But on this point see the Report on Migration of Birds in 1880.

Again, near Alloa, at a locality not far removed from Kin-cardine-on-Forth, where I shot the Black Redstart, Mr. J. J. Dalgleish has recorded* the occurrence of another south-eastern species,—*viz.*, the Desert Wheatear,—which will also be found alluded to in the same Report. At that time also the prevailing winds were E. and S.E.

Now again occurs another Central and South European species (*C. Wolfi*) at the Isle of May, in the Firth of Forth, during prevailing and strong S.E. winds, which species has not before been recorded from Scotland.

What I want specially to point out here is, that the localities of Alloa and the narrow part of the Firth of Forth, and the Isle of May and the shores of the Firth, all *lie in a line*, or nearly so, running from E. to W., and I only desire further to remark that Alloa and that part of the country appears to be visited by many other rarities, such as the Waxwing and Great Grey Shrike, and a line of distribution of the occurrences of the Great Grey Shrike runs also broadly across Stirlingshire, the narrowest part of Scotland. I indicate these facts for further study and comparison, only adding that, as far as I can at present judge from numerous statistics at command, I believe the waves of migration of certain species take certain and fixed lines, according to influence of weather and winds; or, in other words, that certain continental species are known to turn up at certain localities in Britain with greater regularity and precision than at others; and that, in extraordinary seasons and with prevalence of wind from unusual

* Proc. Royal Phys. Soc. Edinb. 1880-81, vol. vi. p. 64.

quarters, a corresponding change will take place in the distribution of so-called "accidental occurrences" of continental species in Britain; and further, that this will be aided to a considerable extent by the northern range of such species on the Continent during the breeding season in exceptionally fine summers, or by the natural extension of the breeding haunts of many species.

One more point I would like to bring forward in support of what I still consider theory, but which to me seems strongly supported already by known facts. In 'The Field' of May 7th, 1881, were recorded occurrences of the Pied Flycatcher in Sutherland and Rosshire; and about the same date other occurrences were recorded from various parts of the east coast of Scotland. A pair lingered a long time at one locality in East Sutherland, but finally disappeared. These, of course, belonged to the spring migration of 1881. Now, how are we indebted for such an unusual visitation so far west of the continent of Europe at this season? My idea—theory, if you will—is as follows:—As we have shown in our Report for 1880 that birds were carried farther west than usual by the easterly gales of the autumn of that year; the consequence of this was that the birds wintered at localities farther west than usual, and also returned to their breeding haunts by routes removed farther west than usual in the following spring.

It may be said it is a pity to advance theories without sufficient bases of facts in such matters, and doing so might perhaps be characterised as unscientific; but I advance it in what I believe to be the interest of our enquiry, whether correct or erroneous; because what we want is more general attention to the meteorological necessities of our investigation, and a wider appreciation by our reporters and those who are assisting us of the necessity of a comparison of the data, year with year, in the future. It is on this account that I would urge the mapping out of the distribution of the occurrences of rare continental forms in Britain, year after year, and also the comparison of these annual maps, the one with the other, and with the meteorological facts of each year.

Mr. J. J. Dalglish and Mr. Freke are doing good work in enumerating all the occurrences of American birds in Europe and mapping them out, and *vice versa*. It would be desirable to

extend this plan to all specimens of the rarer continental species in Britain, the meteorological data, and a corresponding map of Europe, showing the northward range of these birds in the breeding season. We ourselves have not time to devote earnestly to this additional work, but we believe that the field suggested would be sure to yield to any naturalist taking it up as a separate branch, a rich harvest in course of time.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY JOHN T. CARRINGTON, F.L.S., AND EDWARD LOVETT.

(Continued from p. 418.)

Genus XANTHO, Leach.

We now take a final leave of the "Spiders," or triangular-shaped crabs, and come to the ordinary or true crab-shaped form. The first of these genera, taken in the classification hitherto followed, is *Xantho*, Leach. The chief generic characters are a broad, slightly convex, and somewhat wrinkled carapace, massive and hard in its structure; orbits slight; legs short and stoutly built, especially the anterior pair, which are very broad and large; external antennæ very short. Male abdominal segments five in number, female seven, and as usual broader than those of the male.

Xantho florida, Leach.

This interesting crab is usually about two inches broad and an inch to an inch and a half long; specimens, however, occasionally exceed these dimensions. The whole of the exoskeleton, as we have noticed in the generic description, is of a powerful and massive nature, and when we come to look into the habits of the animal this is well accounted for. This crab not only loves to live under large stones and rock masses, but we have frequently observed it in numbers safely ensconced in rocky clefts, into which it forces itself, and from which it is difficult to dislodge it. In fact, its habits in this respect would be quite unadapted to a crustacean with a more delicate carapace.

In the younger state the carapace and legs are very much more wrinkled than they are in the full-grown animal. They are,

moreover, of a dirty brown colour, but turn to a rich dark red as they approach maturity. In the Channel Islands it is called "l'ancien," on account of the somewhat aged appearance of the animal. The tips of the claws are shiny black, which adds to its beauty. Altogether there are few of the British Crustacea more attractive to the naturalist than *Xantho florida*.

The anterior lateral margin of the carapace has four bluntly-pointed teeth on each side of the deflexed portion that takes the place of a rostrum; this portion protects the orbits, which are notched on their lower margin. One of the chief distinctions between this and the following species is that the carapace of *Xantho florida* is convex, whilst that of *X. rivulosa* is very flat.

This crab is recorded by Bell as being found in considerable numbers on the coasts of Cornwall, Devonshire, and Dorsetshire, and has also been recorded from the south and west coasts of Ireland; Galway, very common, the unicoloured variety being as common as those with black-tipped claws; the Hebrides, between tide-marks; South Devon, frequently; Devon coast, common—a frequent light variety, somewhat similar to *X. rivulosa*. We have observed it in large numbers on the low-tide rocks below St. Michael's Mount, Mount's Bay, Cornwall, and the La Rocque shallows of Jersey, where, in each locality, its habit of secreting itself under large rocks was well seen. Owing to this habit it is seldom or never dredged, for a good dredging ground is not the usual resort of this species.

One very marked peculiarity connected with *X. florida*, and indeed with its ally *X. rivulosa*, is the proclivity it possesses for shooting or throwing off its limbs; we have seen a specimen part with its whole ten legs upon being wrapped in linen soaked in alcohol, and in killing others for the purpose of preservation the same thing has occurred.

The ova of this species are very beautiful, being connected by ligatures in massive bunches. Their colour in the early summer, when they are chiefly exuded, is a rich golden, becoming dark, as usual, as development proceeds. We obtained specimens with fully mature ova from Scilly and Cornwall in September and October; and we think that, like some other species, *X. florida* is with ova at periods varying slightly in different localities, and possibly depending somewhat on temperature.

Xantho rivulosa, M.-Edwards.

Leach appears to have considered this species a variety of the last-named, though its specific characters seem well marked. Its size is, on the average, smaller than that of *X. florida*; its carapace is very level, whilst that of the other species is convex. The colour of this crab is very variable, and specimens are often beautifully marked. It is usually of a yellowish tint, variegated with red, some specimens, however, are nearly white, and others possess markings more definite and more numerous. Another marked distinction is the groove with which the movable pincer is furnished, and the pincers themselves are brown, whilst those of *X. florida* are black.

Bell thinks that there is no doubt that this is the *Cancer hydrophilus* of Herbst; he also mentions it as being referred to by Mr. Couch, of Polperro, as more common at that place than *X. florida*. It would be interesting to know if this abundance has been confirmed. Its general habits and locality are similar to those of the last-mentioned species, and we should therefore suggest that where *X. florida* occurs diligent search should be made for the rarer and more remarkable form, *X. rivulosa*. We found this species not uncommonly at very low tide, with *X. florida*, under rocks below St. Michael's Mount, Cornwall. We have received it sparingly from under stones near Lynton, North Devon, and a single specimen from Milford Haven. It has been also recorded from the Shetlands, Hebrides, South Devon, Valentia, and Galway; rare in the two latter localities.

We have taken it with ova at the same time as *X. florida*, and probably it sheds its young at about the same period.

Xantho tuberculata, Couch.

Bell, in the Appendix to his work, mentions, and in fact describes, this species, but we have not yet met with it ourselves, and very little appears to be known about it. If it is a well-defined species, no doubt it is limited to extreme localities, which may thus account for its recent non-occurrence. It is described as partaking of the characteristics of both of the former species, the hands and wrists being somewhat tuberculated and rugose. The whole of the ambulatory feet having the fourth, fifth and sixth

joints hairy, with longer cilia on the edges; the third joint distinctly denticulated along the upper margin, with a hairy patch beneath. The carapace is of a light flesh-brown colour, and the formation of it in some respects resembles *X. florida* and in others *X. rivulosa*.

Mr. R. Q. Couch, who discovered this species, says that it prefers deeper water than the two former species, but that in summer it approaches the shore, and is then found under stones. It spawns in June.

We have no wish to question the existence of a species with which we are so little acquainted, but its description so nearly corresponds to the young of *X. florida*, which species differs very much at various stages of growth, that it almost seems as if the discovery of one or two specimens in an isolated spot might be reasonably attributed rather to a variation owing to local circumstances than to the existence of a new and distinct species, particularly as it so closely resembles both the last-named.

Cancer pagurus, Linn.

This is the "crab" of commerce, and to most people the *only* crab. It enjoys the position of being an object of legislation, and the cause of a large and wide-spread fishing industry.

Cancer pagurus is the sole representative, in our seas, of the genus, though many others exist. The carapace is, roughly speaking, oval, somewhat convex, and having the usual indentation but slightly shown. The anterior margin is regularly notched or rather "crimped." The orbits are circular, and the eyes are capable of being deflected for protection beneath a toothed edge; the antennæ are comparatively small, with the basal joint elongated. The anterior pair of legs are massive and broad, the ambulatory legs hairy, the pincers black and armed with powerful rounded tooth-like projections. The segments of the male are narrow, those of the female broad; they are armed with tufts of stiff hair. The colour of this species is a brick-red or reddish brown, and it does not undergo such a striking change of colour in boiling as do most of the other Crustacea. The tints of young specimens vary considerably, some that we have met with being of a pale yellow, whilst others were, as Bell also mentions, of a purplish hue.

At the time of exuviation the female retires to a secure rock-hole, where she is protected by a male, and it is at this period that impregnation takes place.

Although so common and widely distributed it is not a frequent occurrence to meet with it in ova. Bell records that, according to Mr. Couch, this is deposited at all seasons of the year. We have not as yet had the advantage of meeting with it in a way that would enable us to describe it accurately from personal observation.

This crab is known from almost all parts of our coasts, and is recognised by various names, the principal of which are, of course, "The Crab" and the "Edible Crab." In Scotland they are called "Partens;" in Kent, "Pungs." In Jersey it is known as "Poingclos;" in Guernsey, large full-grown examples, "Chancre;" in some parts of France, "Torteau."

We cannot pass over its occurrence in the Channel Islands without protesting against the way in which the extermination of this article of food is gradually there being carried out. It is a usual sight in the markets at St. Heliers to see, offered for sale at a mere nominal price, literally bushels of young *C. pagurus*, less than three inches across the carapace. As an article of food they are, at this age, comparatively worthless; whereas if their capture under a certain size were rigorously prohibited, as in England, the probability is that an ordinary sized specimen might sometimes be procured at a reasonable price, and would, moreover, be within the reach of those who are at present compelled to regard it in the light of a luxury.

The fishermen of Mount's Bay, Cornwall, say that formerly none but male crabs were taken for the market, owing to their superiority, but that of late years females have also been taken and sold at a lower price—often for as little as a penny or two-pence each. The French boats which sometimes enter Cornish waters are frequent purchasers of these female crabs. The result of this is only what might be expected—namely, that this animal is gradually becoming less abundant there, and also at Mevagissey, where the same practice has been carried on. In how many other localities this state of things occurs we cannot say, but if the commercial value of the female crab as an article of food be so much inferior to that of the male, when we consider to what prejudicial results their persistent capture will lead in

diminishing the supply, we cannot but express our surprise that this practice is permitted to continue.

The method in which crabs are caught is probably well known. The crab-pot—called in some localities “creel”—is a wicker basket-like trap, the entrance of which is usually at the top, and egress is rendered impossible by the ends of the willow-stems being turned inwards and cut off just below the opening, on the principle of an eel-trap. These pots are sunk in a rocky locality, in about twelve feet, mean depth, of water, by means of stones tied to the bottom, and are baited with pieces of fish, frequently dog-fish. There is a prevalent idea that crabs are attracted by decomposed bait; but, although this is true as regards lobsters, prawns, &c., it is not so as regards crabs, for we have frequently seen fishermen rebait their pots, even when the piece of fish used as bait was but slightly tainted, for they said it was no use at all unless quite fresh.

As we have already pointed out, this crab is very widely distributed in the British seas, and it is a remarkable fact that on the western coast of England they grow to a much larger size than those on the eastern coasts; whereas at Galway, on the west coast of Ireland, it is said that they not only do not attain such dimensions, but are also inferior as an article of food to those taken on the east coast of Ireland.

The chief crab fisheries on our English shores are in the counties of Northumberland, Yorkshire, Norfolk, Sussex, Hampshire, Dorsetshire, Devonshire, and Cornwall. In Scotland the principal stations for this industry are on the east coast, and on part of the north coast between Duncansby Head and Loch Erribol, although some are occasionally fished on the west coast. Crabs are not generally articles of consumption in Scotland as in England; whilst in Ireland, owing partly to disfavour, but principally to difficulties in transit, they are still less eaten.

The mode of sale of this crustacean seems to vary considerably in different localities; for instance, in Billingsgate they are generally sold by the barrel or kit, whilst in Bognor, we understand, they are sold by weight; in other places, however, they are most frequently sold by the dozen. In some parts of Cornwall a dozen consists of twenty-six crabs, over the gauge, or fifty-two crabs if under the gauge. This gauge is five inches across the widest part of the carapace, taken from side to side,

and not from the rostrum to the abdominal segments; but owing to the variation in size in different localities, to which we have already referred,—and which may possibly be due to more or less favoured conditions,—there appears to be some necessity for a kind of sliding scale to meet this variation.

(To be continued.)

OCCASIONAL NOTES.

SCARCITY OF THE BADGER IN SUFFOLK.—I am sorry to have to record the death in this county of a Badger, which was trapped in a wood at Great Bentley, near Ipswich, and was afterwards found and killed by some labourers, it having dragged the trap and chain a considerable distance. This animal must be on the very verge of extinction in Suffolk, though existing in a few localities, as a rare animal, within the memory of man. It is a great pity that this should be the case, as a few of these interesting animals would surely do but little harm in many large woods, especially where Foxes rather than Pheasants are preserved, and would be a source of great interest to many. The present deplorable system of extermination which for years has been carried on by gamekeepers against so many species of birds and animals, many of them certainly doing more good than harm, is tending rapidly to diminish our list of carnivorous and partially carnivorous mammals, at any rate in this district; and the corresponding increase of animals really noxious to man, when allowed to multiply to too great an extent, as rats, mice, and moles, is equally apparent; whereas if a certain proportion of their natural enemies were allowed to live, their numbers would soon be reduced without the aid of that most objectionable and then unnecessary personage, the professional rat-poisoner, the victims of whose skill are far from consisting exclusively of rats and mice.—G. T. ROPE (Blaxhall, Suffolk).

FOOD OF THE SHORT-TAILED FIELD MOUSE.—Noticing the large amount of food consumed by a Short-tailed Field Mouse, *Arvicola agrestis*, which I am keeping in a cage, I determined to weigh the quantity supplied and eaten in twenty-four hours. Just now I am giving it clover, and find six drachms (apothecaries' weight) to be barely sufficient to last it twenty-four hours, and as the little creature does not, I suppose, much exceed an ounce in weight, the consumption is enormous; and one can quite understand that where they are very numerous they might eat up all the herbage,

as they are reported to have done, in years gone by, on the marshes of Dengie Hundred, Essex, and elsewhere. Until I made this experiment I could not properly realise the amount of destruction to herbage the Rodents are capable of; the sum total for this county only would be enormous.—HENRY LAVER (Colchester).

ON THE FOOD AND HABITS OF THE BITTERN. — The note on the Bittern in Mr. Norgate's interesting paper "On the Food of Birds" (p. 410), called to my remembrance a curious incident witnessed by myself and some of my brothers many years ago in Oxfordshire. And as its history is instructive as well as amusing, I will give it *in extenso*:—One day, in mild weather, about the middle of December, I and three of my brothers were Snipe-shooting in a small marsh, where those birds were accustomed to congregate in great numbers. In the middle of this marsh was a tract of ground, about two acres in extent, covered with tall reeds, and traversed, or rather bisected, by a somewhat rapid brook, whose banks were much elevated above the level of the marsh, and covered with tussocks of long sedge. We had with us on the day in question three of the best Snipe-dogs that were ever seen; they never ranged wider than ten or twelve yards from the gun, and never failed to find every Jack Snipe within three yards of their path. These dogs were German Water Spaniels, a scarce breed, and invaluable for any kind of shooting, but one which the climate of England does not seem to suit; perfectly mute themselves, they would instantly respond to any sign from their master's hand without requiring a word to be spoken. I much regret to add that we have long ago lost this breed, and have never been able to replace it; their portraits are now all that is left. I feel sure that most of your readers will sympathetically pardon this short digression; and now I will go on with my story. We had carefully beaten the whole of the reeds, had bagged ten or twelve couples of Snipes, and fired at the least half as many more shots. Just then I was following my brother Bertie along the bank of the brook, and, supposing that nothing could be left there, had turned into the flood-water to cross over to another part of the marsh. I had not, however, advanced many steps before I heard him exclaim, "Look out! whatever you do, look out!" I turned quickly round and saw him, with his head thrown back and his gun extended in front, make a plunge into a tussock or sedge, and immediately after emerge therefrom dragging out an immense Bittern by the neck. The scene was most picturesque and exciting; the Bittern was in a fury, his splendid crest and hackles were set up to their fullest extent, he beat his captor violently with his wings, and with his long claws scratched viciously at his body, until I had secured his legs. In a minute the whole party had assembled, and a council of war was inaugurated; it seemed monstrous to

murder such a noble bird in cold blood ; some advised throwing him up and taking the chance of a fair shot ; one very faintly suggested a free pardon ; but at this conjuncture the compression of his throat, together with alarm at finding himself in such an awkward predicament, appeared to take a violent effect upon the stomach of the Bittern ; spasms came on rapidly, and, on the pressure of his throat being relaxed, he forthwith began to discharge the contents of his stomach. First appeared a good-sized Jack, at least four ounces in weight : this was followed by five other Jacks from two to four inches long ; then came a Bull-head, and, last of all, a Water Newt. Such an exhibition of plunder at once sealed his fate, and, taking a powder-flask from my pocket—those were days of muzzle loaders—I administered the *coup de grace* by a sharp blow on the back of the head, and, a long pole having been procured, on which our prize was hoisted as a banner, we all marched home in triumph. Two facts in the life-history of the Bittern may be learned from this incident. With reference to Mr. Norgate's subject, it would appear that Pike form its favourite food, and, although its taste is somewhat indiscriminate, I believe them to be the objects of its choice. Again, the conduct of this bird in remaining concealed for probably as much as two hours, in the course of which between thirty and forty shots had been fired in the immediate vicinity of its lair, and its whole neighbourhood disturbed by the passing and repassing of four men and three keen-scented dogs, opens our eyes to the lurking and sedentary habits of the species. Indeed, since that affair I have always believed that the Bittern is far more common than is generally supposed. I have myself seen the bird on four different occasions in Oxfordshire, and, I doubt not, have unconsciously passed many others. I once saw a bird of this species rise from a grass-field, and ascend with a perpendicularly spiral flight of no great diameter, until it was beyond the reach of eyesight in the clear sky ; but I believe that I have seen the same style of flight mentioned elsewhere. To this story of the Bittern I can add another note on the food of the Godwit, which may possibly apply to other waders also. A well-known birdstuffer in Oxford, the late Mr. Forrest, had in his possession a tame Godwit of the common bar-tailed species. This bird was very fond of any kind of corn. I have often seen him pick up the grains from the floor with the point of his long bill, and then, by a sudden movement of his head, jerk them upwards into his mouth ; the motion was amusing, and very neatly executed.—A. MATTHEWS (Gumley, Leicester-shire).

OCCURRENCE OF THE GREAT REED WARBLER IN KENT.—While snipe-shooting on September 14th I came across a warbler of some kind, which I failed to identify satisfactorily. I had marked a Snipe down, as I believed, in a watercress-covered stream which flowed between an alder-bed on one

bank, and a bank of very high reeds on the other. I had not gone far up the windings of this channel, pushing aside the tall *Lythrum* and *Eupatoria* as I went, when the bird in question rose out of the coarse herbage and instantly entered the reed-bed opposite. Being struck with its appearance, which differed both in size, colour, and manner of flight from the Reed Warblers that I had met with more or less all day, I signalled to my keeper, who was carrying my marsh-jumping pole, and when he came up I sent my retriever into the reeds where the bird had entered. The bird moved through the reeds at once before the dog, and my keeper seeing it, forced it out by a thrust or two of the pole. It flew along the water-course very low, just topping the cresses, with a weak fluttering flight, and some dust-shot then struck it down. I anticipated no difficulty in identifying it by a reference to Gould's 'Birds of Great Britain,' and I turned at once to the description of the Thrush Warbler, *Acrocephalus turdoides*. Beautiful, however, as are the plates, and admirable as are the popular descriptions in this work, it is unfortunately wanting generally in precise information as to measurements, colour, &c., and in this instance nothing beyond the plate is given towards identifying a supposed specimen. Gould's figure measures 8 inches; my bird measures $7\frac{3}{8}$ inches. The general aspect, structure and size of the bill, and markings—as far as the bird possesses them—agree, with the exception of feet and tarsi, which in the coloured plate are of a pale yellowish brown, and in my freshly-killed bird a very decided light bluish slate-colour. Without professing to give a scientific description of my bird, I should describe it as follows:—Bill, upper mandible brown; lower, purplish brown, lighter towards the gape; point to gape, one inch exactly. Top of head raw umber-brown, with a lighter line over the eye from the base of the bill to the top of the auricles. Upper portion of head, neck, back, wing-coverts, primaries, secondaries, and tertials, umber-brown, with a raw sienna tint. Rump and tail the same brown, with a reddish yellow tint. Chin whitish. Under parts whitish, tinged with raw sienna, deeper on the coverts of the thighs. Under tail-coverts tinged with yellow-brown. Greater wing-coverts and primaries faintly margined on outer webs and ends of feathers. Eleven feathers in tail; middle feather the longest; tail cuneiform. Irides brown. Length from point of bill to end of tail, $7\frac{3}{8}$ in. Tarsi bluish slate, $1\frac{5}{8}$ in. long; toes brownish. Second quill-feather the longest in the wing. The bill is strong, and the form of the head very like a Redwing's; in other respects the form more nearly resembles the aquatic warblers, though somewhat more elongated. Can you help me to identify this species? I have been particular in a description of its "manners" when first moved, since its disinclination to leave the reed-bed and its very short flight coincide with Gould's description of the Thrush Warbler. Its greater length and deeper colouring are the chief points where agreement is wanting; but perhaps, if his work has a fault, it is in its general too high

colouring. Since writing the above I am convinced the bird is *Acrocephalus turdoides*. Mr. Gordon, the curator of the Dover Museum, is quite satisfied about it. We have compared it with Yarrell, and it answers exactly, with the exception of the length— $7\frac{3}{8}$ in. against Yarrell's and Gould's 8 in.—and the colour of the legs, given by both Gould and Yarrell as brown; whereas mine, when fresh, were slaty-blue. My bird's legs, having dried, have now turned brown. As to length, Yarrell quotes Latham, and does not speak from his own observation, and no one can read Gould's letterpress without seeing that he mainly went to Yarrell for his description. On skinning my bird it turned out to be "a perfect ball of fat,"—so Gordon described it,—and this might perhaps account for its laboured flight, which surprised me.—W. OXENDEN HAMMOND (St. Alban's Court, Wingham, Kent).

[The proper name which this bird should bear, according to Professor Newton (Yarrell, 4th ed., vol. i., p. 365), is *Acrocephalus arundinaceus* (Linnaeus).—ED.]

OCCURRENCE OF THE RUSTIC BUNTING (*Emberiza rustica*) IN YORKSHIRE.—To record the addition of a new bird to a county-list is always a pleasing duty to one specially interested in its avifauna; but when the species is one whose claim to be considered British has hitherto rested upon the somewhat unsatisfactory basis of a single occurrence, it is not only an additional pleasure, but to British ornithologists generally it is a matter of considerable importance as substantiating a claim which otherwise might be regarded with somewhat mixed satisfaction. Up to the 17th of September last the only example of this species known to have occurred in Britain was caught alive near Brighton on October 23rd, 1867, and is included in Prof. Newton's 'Yarrell' (vol. ii. p. 29). The second British example, now to be recorded, was shot on the beach at Easington, in Holderness, on the 17th September last, by Mr. Townend, of that village. When first observed the bird was on the sands close to the sea; on being approached it took a short flight, alighting for a moment on some thistles, and again returned to the sands and was shot. Mr. Townend gave this bird to Mr. W. P. Lawton, who set it up for his beautiful collection of local birds. Unfortunately, not knowing the value of the capture, Mr. Lawton failed to make a note of the sex and other particulars which would have been interesting. The bird remained unidentified until I visited Easington on October 7th, when I at once saw that it was one of the rarer Buntings, and brought the specimen to Leeds with me for examination and comparison. I may say that my identification of the bird has been kindly confirmed by Prof. Newton, in whose custody the specimen now is, and by whom it will probably be exhibited at the next meeting of the Zoological Society. In plumage this specimen agrees very well with Mr. Dresser's figure of the young female, but on the back, breast, and flanks the markings

are much more vinous—in fact, more like those of the adult male in tint. It is interesting to know that Herr Gätke, in a letter to my friend Mr. Cordeaux, dated from Heligoland, Sept. 17th (the day on which the Yorkshire example was obtained), says “got to-day *E. rustica*, a fine young bird.” Probably the Heligoland and the Yorkshire bird were near relations, or at least travelling companions from the north-east.—W. EAGLE CLARKE (Leeds).

BIRDS AND TELEGRAPH-WIRES.—Many of the birds whose existence is cut short by flying against telegraph-wires belong to the migratory class, and probably many of these accidents occur during the hours of darkness. Occasionally, however, a non-migratory species is killed in broad daylight. A few summers ago a gamekeeper showed me a female Black Grouse, which he had seen fly against the wires and drop dead. On dissection I found its neck was broken and its breast severely cut and bruised. Some of this mutilation was doubtless caused by its fall to the ground, as it was a heavy, plump bird; but that the force of contact against the wires had been sufficient to cause immediate death is unquestionable. Once in my evening rambles I picked up a Partridge that had met with a similar fate, and it could not have been dead a very long time, as the body was warm when I found it. I often have birds sent me that have been killed in this way, and the great majority of them are picked up by men whose work takes them on the line of railway early in the morning. It is only during the past month of September that two species were thus found and sent to me, *viz.*, a Spotted Crake on the 3rd and a Ring Ouzel on the 28th; both were much cut about the head and neck, and the last-named bird had its breast-bone completely smashed, whilst the skin of the breast had been cut as with a knife, and one of its eyes had also been knocked out. In previous seasons I have had the Wheatear, Nightingale, Corncrake, Jack Snipe, and one or two others killed in like manner, and if I mistake not, all at the time of the spring or autumn migration. But I by no means wish it to be inferred that such accidents occur only at the periods stated; my experience points to them as worthy of notice. Many readers of ‘The Zoologist’ whose experience is much more extended than my own will perhaps give us the benefit of their knowledge upon the subject.—G. B. CORBIN (Ringwood, Hants).

ORNITHOLOGICAL NOTES FROM WEST CUMBERLAND.—In February, 1880, a shepherd told me he saw four Snow Buntings (called by him “flakes”) on Bleng Tongue, a high-lying piece of ground in Gosforth parish; and in December a pair of Peregrines were seen by the same man near his house. In June a pair of Ravens were trapped on Burnmoor; the keeper sent them to me, and I found the larger to be an exceedingly fine hen bird, and the other a well-grown bird of the year; both had been caught by the

foot. The same month a pair of Eider Ducks were killed by a fisherman on the Ravenglass Estuary; I was told that they had got entangled in the fish-garth and were killed with a stick, and that they were a pair; but although I was on the spot the next day to secure them they were already plucked and roasted. On January 13th, 1881, the keeper put up a fine pair of Goosanders on Burnmoor Tarn; he brought down the drake, and fired at the duck, which escaped to Wastwater, only to be shot there next day by a farmer; both were sent to me, and are now in the collection of Mr. J. L. Burns-Lindow. On January 15th I saw a large flock of Geese off Seascale, but too far away for identification. An enormous number of Widgeon frequented the mouth of the Irt last winter; and on January 25th a flock of seven Brent Geese appeared, one of which was shot. On the 26th a young male Goldeneye was killed on the Irt above Santon, being much higher up the river than I have ever known one before; it was a solitary bird. On the 29th four Brent Geese were seen off Seascale, and the next day one was sent to me which I believe was killed on the Irt; these Geese are not often seen here. Between January 23rd and February 2nd great numbers of Shelldrakes arrived. On February 3rd two Brents were seen on the Irt in company with Widgeon; the keeper stalked them, having got a rise, and killed one of the geese with his first barrel, and two Widgeon with his second. On the 8th, during hard frost a farm lad surprised a Scoter in a ditch near Seascale Hall, and killed it with a stone; it was an adult, and fat. On February 15th I noticed five mature Great Black-backed Gulls on the shore at Seascale, and again on the next day; these mature birds are uncommon here, though the young are common enough. On March 22nd I saw a large flock of Black-headed Gulls for the first time this year. On August 23rd we had a violent storm, which wrecked two vessels on our shore, and on going down to see these, I picked up a Manx Shearwater still alive; the web between the toes of the right foot was distended with fluid so as to form a lump as large as a small walnut; I punctured this and let the fluid escape, which evidently relieved the poor thing, but it died next day in spite of care. On August 27th some one sent me by post a Sparrow very curiously mottled with white.—CHARLES A. PARKER (Gosforth, Carnforth).

ORNITHOLOGICAL NOTES FROM DUBLIN.—A fine specimen of the Osprey, *Pandion haliaëtus*, fell to the gun of Mr. W. Williams, jun., at Clontarf. The bird had been observed inland at Dundrum, five miles south of the city, towards the end of October, flying about mobbed by Rooks, and a few days afterwards it made its appearance at Clontarf, on the shore of the bay, about a mile and a half from the Dublin Post-Office in a northerly direction. Mr. Williams, who was out shooting early in the morning, noticed it slowly hovering over a stream intersecting the sands, looking for fish; occasionally

it came to rest on the top of one of the telegraph-poles surmounting the railway embankment that here crosses the estuary. Whilst gaining a footing there the feathers of the head were erected, looking like one of the Short-eared Owls, and it emitted a loud clucking cry, swaying its body to and fro, the wings fully expanded. After a most exciting chase, during which another person fired at and missed it, Mr. Williams, by crawling amongst the grass and weeds, succeeded in bringing it down by a long shot just as a train came rapidly along. Though severely wounded it made a desperate fight, striking out right and left with its strong talons and beak, and screaming fiercely. It was in immature plumage, and the extended wings measured five feet three inches from tip to tip. On September 7th three Curlew Sandpipers, *Tringa subarquata*, were shot at Clontarf, and a week later twenty-two were obtained out of a large flock near the same place. On September 24th, at Malahide estuary, near Dublin, three Little Stints, *Tringa minuta*, were obtained, the only ones seen. The following birds have also been received by Messrs. Williams & Son for preservation:—Two Great Northern Divers, *Colymbus glacialis*, in full adult breeding plumage, one killed by a rifle-bullet at the mouth of Waterford Harbour, the other killed at Lough Foyle. A cream-coloured Lapwing; that is, cream-coloured with the exception of a few blotches of faded brown across the breast and tips of the wings; even the delicate crest is almost quite white. A curious cream-coloured variety of the Heron, *Ardea cinerea*, similarly mottled with pale brown; and a cream-coloured Swallow.—A. WILLIAMS (7, Grantham Street, Dublin).

[If these varieties had been secured alive and kept in confinement, they would in all probability have assumed their normal colours on moulting. Such at least has been the case with a cream-coloured Lapwing which has been for some time in the Western Aviary at the Zoological Gardens, Regent's Park; and we have known the same thing to occur in the case of a pied Blackbird.—ED.]

ORNITHOLOGICAL NOTES FROM ALDEBURGH.—On July 27th I noticed a good many birds about the meres. Herons, Terns, Gulls, Ringed Plovers, and Dunlins were plentiful, and I saw a lot of Teal and a single Snipe. On July 30th an old Cormorant crossed over from the meres to the sea, and passed along shore towards the river within a hundred yards of me. The following day I saw a great quantity of Ducks in the further mere—not less than fifty couples. Very few were obtained through the first week of the shooting season, as after the first shot or two they all returned to the decoys. On August 9th I heard and saw a single Greenshank at Thorpe. A week later I walked down to the Lighthouses. A good many Terns were still to be seen about their breeding-place on the shingle between the two Lighthouses, and from their actions some appeared to have young ones still

unable to fly. Although a vast number of eggs are taken every year the number of neither species (the Common and Lesser) seem to be at all diminished. I shot an immature Turnstone close to the Low Lighthouse. Walking along the river-wall between Aldeburgh and Iken on August 20th, I met with a single Black Tern hawking for insects over the ditches. This Tern is by no means common on the Suffolk coast. A day or two afterwards I killed an adult Lesser Black-backed Gull in the most perfect summer plumage.—JULIAN TUCK (Bucknall, Stoke-on-Trent).

GLOSSY IBIS IN NORFOLK.—Mr. George Cresswell informs me that a male bird of this species, now in his possession, was killed on the Wolferton Marshes, near Lynn, on September 16th. Others were seen at the same time, and he believes a second one killed, but he has not at present been able to ascertain what has become of it. Messrs. Sheppard and Whitear, in their 'Catalogue of Norfolk and Suffolk Birds,' speak of one of these birds as having been killed near Lynn in the winter of 1818. This bird is referred to in the "Calendar" kept by the Rev. W. Whitear, extracts from which have been recently published by the Norfolk and Norwich Naturalists' Society ('Transactions,' vol. iii. pp. 231—262). He says under date February 9th, 1820:—"I also saw at the same time [at Hunt's] a specimen of the Glossy Ibis, which I was told was shot in the winter of 1818, on the marshes on the western coast of Norfolk, near Lynn." But an earlier reference to a Glossy Ibis occurs under date of October 19th, 1819, as follows:—"He [Hunt] also says that an Ibis was killed *this year* in Norfolk." At first sight it appears as though two distinct birds were recorded, but I think there can be no doubt that the latter entry is an amplification and correction of the earlier one, and that both refer to the same bird.—THOMAS SOUTHWELL (Norwich).

[We have heard of two others obtained this autumn, one in Lincolnshire, the other in Hampshire, but no particulars of their capture are yet to hand.—ED.]

BUFFON'S SKUA IN DUMFRIESSHIRE.—A fine adult male of this species was shot in Torthorwald parish, at a place some six or seven miles from the shore, on the 12th June last. I had an opportunity of seeing the bird shortly afterwards, while it was in Mr. Hastings' possession for preservation. Its plumage was perfect, and the throat, neck, and under parts were suffused with crocus-yellow. A friend residing at Tuxford, in Nottinghamshire, writes to me that a Buffon's Skua was captured at Westwood, near that place, on June 8th, and kept alive for about three weeks. It became very tame, and having one wing cut was allowed to walk about. It disappeared one morning, and its owner, Mr. John M. Dufty, inserted a paragraph in a local newspaper, containing a description of the bird, and a request for its return if it could be caught alive. Strange to say, it was

captured at a place fifteen miles distant, six days afterwards, and returned to Mr. Dufty; but the journey had been too much for it, as it died immediately afterwards.—R. SERVICE (Maxwelltown, Dumfries, N. B.).

LATE STAY OF SWIFTS IN NORTH OXON.—Swifts were with us for a very long period this season. They arrived early (May 2nd) and stayed unusually late. They generally depart by the middle of August, but this year I noticed them in small numbers and screaming loudly on the 22nd—about a dozen on the 25th, a very few on the 27th, and two on the 30th. No more were seen till September 11th, when we saw a single bird. There was a very large congregation of Swallows and Martins on the house and trees at Bodicote on the 17th September. They appeared to be all young birds, and left during the day; but the old birds have not entirely disappeared yet (October 2nd). They are often seen till the middle of that month.—OLIVER V. APLIN (Bodicote, Oxon).

REPORTED OCCURRENCE OF THE ROSEATE TERN ON THE FARNE ISLES.—I very much doubt the statement that "several pairs of Roseate Terns bred on the Farne Islands this year," as mentioned by Mr. Cordeaux's correspondent (p. 423), and feel quite sure that the light-keepers are mistaken in the Roseate Tern. I had abundant evidence of this last autumn, and could give several instances in proof of what I assert, *viz.*, that the boatmen and light-keepers mistake the Sandwich Tern, when more than usually pink on the breast, for the Roseate.—T. H. NELSON (Redcar).

EUROPEAN BIRDS OBSERVED IN NORTH AMERICA.—Another occurrence of the Tropic-bird in Europe may be mentioned besides the three noticed by Mr. Freke (p. 365), namely, a specimen picked up dead many years ago in Worcestershire (*vide* 'Zoologist,' 1871, p. 2666), now in the collection of Mr. William Heaton, of Reigate, where I had the pleasure of inspecting it some time ago. The feathers of the tail proper and wings are a trifle worn, otherwise it is a very fine bird. There is also an occurrence of the Cape Pigeon, *Daption capensis*, in this country, recorded in 'The Zoologist' for 1869, p. 1921.—J. H. GURNEY, Jun. (Northrepps, Norwich).

OSPREY IN WEST CUMBERLAND.—About the 10th of last September a large bird was seen sitting on the Rectory chimney at Gosforth. In the course of the following week a large hawk with a whitish head was seen chased by a Kestrel in Lingbank plantation. The next day it was seen flying low, following the course of the River Bleng. Finally, on the 23rd, it was seen by the miller to come through the trees by the river and perch upon the roof of his house, and commence to preen his feathers. He thought it was an Owl till it turned its head, and then, seeing it was a strange bird, he ran into the house for his son, who came out with his gun and knocked the poor bird over. The body was carried about the village and caused great wonder and discussion till it was finally brought to me. I found it to

be a fine male Osprey, in good plumage, measuring twenty-three inches in length and five feet two inches across the wings. It was extremely thin and poor, the stomach being absolutely empty.—CHARLES A. PARKER (Gosforth, Cumberland).

WHITE PARTRIDGES IN SURREY.—This season there have been on Mr. Lewis Loyd's property, Spring Park, near Shirley, Croydon, no less than eleven pure white Partridges—five in one covey, three, two, and one in others. The keeper noticed them when quite young; the one died when young, but the five, three, and two were all reared; of these nine have been shot. I carefully examined one Mr. Loyd kindly gave me the morning after it was shot, and found the legs of a dirty straw-colour, and the eyes a pale grey-blue, with no distinct pupil, so no doubt in life they would have been pink, and the bird a true albino. Thorpe, of South Croydon, who is preserving mine, has also two of the others for preservation, and these are certainly older than the one I have. Mr. Loyd's keeper tells me he has never before seen any white birds on the estate, and can form no idea why they should have occurred. Can any reason be given for this singular freak of nature? If all had been in one covey it would be supposed that ill health or disease had something to do with it, but occurring in five covies it seems unlikely that this was the cause.—PHILIP CROWLEY (Waddon House, Croydon).

HOOPOE NEAR BRIGHTON.—On the 27th August last, whilst at Portslade, near Brighton, I saw a Hoopoe on the lawn by the side of the house I was visiting. It flew away and did not return again that day, but returned the next and remained until the 30th, when, hearing that several people with guns were on the look-out for it, I shot it. It proved to be a female, and was in very fair plumage.—HERBERT LANGTON (Brighton).

CHOUGH IN OXFORDSHIRE.—An examination of a specimen in the Oxford Museum and a reference to the plate in Mr. Dresser's 'Birds of Europe' leave me very little doubt that the Chough I mentioned last month (p. 422) is the Alpine bird, *Pyrrhocorax alpinus*, Koch, as suggested in your editorial note. With regard to its having escaped from captivity, I may say that the plumage was clean and not rubbed in the least, nor did the food found in the stomach point to its having been caged at any very recent period. Possibly though it was an escaped bird, and had been at liberty long enough to lose its marks of confinement.—OLIVER V. APLIN (Bodicote, Oxon).

BLUE-THROATED WARBLER AT DARTFORD.—On September 4th I shot a specimen of the Blue-throated Warbler in the marshes near Dartford. I take it to be the Scandinavian form, as it has a decided rufous spot above the blue breast, the same colour as below the blue band.—W. DAVIES (Hythe Street, Dartford).

REDWING NESTING IN PERTHSHIRE.—The occasions on which this bird is known to have bred in England seem to be very few, and perhaps the readers of 'The Zoologist' may be interested in hearing that there was undoubtedly a nest in the Blairgowrie district of Perthshire this summer. It was probably in a large fir wood on a hill of some 2600 feet in elevation, forming part of my father's highland shooting, for though unable to find the actual nest I observed the birds about for some time, and on the 25th August shot a young Redwing, in good plumage, which is now being preserved. I have also been much pleased to notice this year how much the Capercaillies are increasing in numbers in many Scotch woods. Many of them fell to our guns in the ordinary course of shooting, and on one occasion, had we so wished it, we could have shot twenty in half an hour's walk through a neighbouring forest. They are grand birds, and well deserve protection and indulgence at the hands of owners of moors and forests, in spite of their fondness for young spruce tops.—EDWIN LESTER ARNOLD (15, Haroldstone Road, Cromwell Road, S.W.)

UNCOMMON SEA BIRDS AT FLAMBOROUGH.—On the 20th September I received from Mr. Bailey, of Flamborough, a Little Gull (bird of the year), two Richardson's Skuas (one adult with white breast, one a dark immature bird), and a Great Shearwater.—JULIAN TUCK (Bucknall, Stoke-on-Trent).

GREAT CRESTED GREBE IN WARWICKSHIRE.—About the middle of September a Great Crested Grebe, *Podiceps cristatus*, Linn., was picked up in a field about 200 yards from the brook at Priors Marston, Warwickshire. It proved to be a male bird in perhaps its second year. Although it was unable to fly, I could not find that it had suffered any injury; probably it was exhausted.—OLIVER V. APLIN (Bodicote, Oxon).

SABINE'S GULL NEAR DUBLIN.—Mr. Glennon, of Lower Merrion Street, has shown me an immature example of this rare gull, which he shot on September 24th close to the Pigeon House Fort at the entrance of the River Liffey. It is a male bird in the first year's plumage, and weighed six ounces and a half. I saw it on the 26th, while quite freshly killed. In the stomach were found only the remains of a few bivalve shells. This is, I believe, the ninth Irish specimen.—A. G. MORE (Museum of Science and Art, Dublin).

HONEY BUZZARD IN HERTFORDSHIRE.—On September 23rd, while shooting at Little Hadham, near Bishop's Stortford, Hertfordshire, a Honey Buzzard, mobbed by some half-a-dozen Rooks, flew over me, and I was fortunate enough to secure it. It was a female in very dark plumage, and measured fifty-three inches and a half from tip to tip of wings.—HERBERT LANGTON (Brighton).

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THE ANNALS OF IRISH ZOOLOGY.

BY THE EDITOR.

(Concluded from p. 445.)

In the year 1744 a number of gentlemen in Ireland formed a society, known as "The Physico-Historical Society," with the object of investigating the Natural and Civil History of the several counties of Ireland, and raised funds by subscription "to employ proper persons to travel through the kingdom, to make observations and collect proper materials for the purpose." The labours of this Society began to bear immediate fruits: in the same year appeared 'The Ancient and Present State of the County of Down,' which, though bearing no author's name on the title-page, is usually attributed to Walter Harris; and this was followed, in 1746, by the 'Ancient and Present State of the County and City of Waterford,' by Dr. Charles Smith, who, in 1750 and 1756, published two similar works relating to the Counties of Cork and Kerry. Of that on Kerry, Macaulay wrote, "I do not know that I have ever met with a better book of the kind and of the size" (Hist. Eng. iii. p. 136), and all three of Dr. Smith's works were reprinted with additions in 1774. They have now become scarce and valuable.

To refer briefly to the first volume of the series, Harris's 'County of Down,' there is an account therein (p. 146) worth perusal of the pearl fishery which used to be carried on formerly

on the River Bann, near Bann Bridge, the much-coveted mollusc being the Pearl-bearing Mussel, *Unio margaritifer*. The author says:—"The common method of fishing for these mussels in the Bann is very simple. In the warm months, while the river is low and clear, the poor people wade into the water, and some with their toes, some with wooden tongues, and others with sharp sticks, thrust into the opening of the shells, take them up. But this method can be practised only in shallow water; whereas the large mussels and the greater quantities are found in deep smooth water. If dredges or other mechanical contrivances were used to fish the deep waters in the Bann, they might probably meet with better success in the size, and it may be in the colour of the pearls." But he adds:—"The pearl-fishery in this river is of late not much pursued, few pearls being to be met with, and those in smooth deep water. Most that are found there now are not much larger than the head of a small pin, and of a dusky faint colour; yet a pearl has been within these few years taken near Bann Bridge of the size of a middling pea, but so muddy and full of specks that it was of little value."

Sir Hans Sloane had some of these pearls sent him, and said they were of the same sort with those of England and Lorraine, and probably differed little from the British pearls described by Tacitus as *subfusca ac liventia*—of a pale brownish colour.

In Chapter xviii. an account is given "Of the Feathered and Finny Tribes of this County." Amongst the more remarkable birds noticed are the Chough, sometimes seen in the neighbourhood of Killileagh, but "a stranger to the rest of Ireland except a few on the shores of Lough Earn in the County of Fermanagh, and (as we are informed) some in the County of Clare;" the Bittern, "frequenting quaggy marshes among bulrushes and reeds, and common in the lower Ardes and about Magherelin and other places"; the Water Ouzel, "a bird very common in this county, and to be found about many rivers near the mountains, and sometimes about rivers at several miles distant from them;" the Black-tailed and Bar-tailed Godwits and the Stone Curlew "often met with on the shores of this county, on Anahilt Bog, and about Killileagh." Assuming that no mistake was made in identifying the species, it is curious that a bird characterised a century later by Thompson as an extremely rare

visitant to Ireland, should, in 1744, have been noted as common in the localities above mentioned.*

The Crossbill is noticed (p. 228) as a winter visitant. "They are not natives of this county; yet many of them were seen at Waringstown in the winter of 1707, of which Mr. Samuel Waring gives an account to Dr. Molyneux by letter that year, an extract of which is among Dr. Gilbert's collections in the College Library."

The Sheldrake is referred to (p. 230) as a resident, breeding in rabbit-burrows on the shores of this county, particularly about Killileagh, and the south of the barony of Lecale.

Great numbers of Wild Swans, it is said (p. 233), used to breed on the islands of Strangford Lough.†

The account which is given of the fishes, both marine and fresh-water, too long to be quoted here, deserves attention, especially the remarks on the Lake Trout and Pollan. Of the latter fish the author, after describing it, remarks:—"This fish was for a time supposed to be a peculiar inhabitant of Lough Neagh, but time has corrected that error, and it is now known that Lough Earn, in the Co. Fermanagh, has the same sort of fish, though not in so great plenty."

Chapter xix. (pp. 241—250) treats "of the Herring Fishery of this county in particular; and something in general of the decay of the Herring Fishery on all the coasts of Ireland; with some hints concerning the recovery and improvement of it."

In Smith's 'History of Waterford' (1746) we find some testimony to the decadence of certain species which were at one time numerous in Ireland. Thus of the Red-deer it is stated (p. 343):—"In the mountains of Knockmeledown we have some remains of the Red-deer, but so few that it is to be feared the species will in a few years be extinct, especially if a little more care be not taken of them."

* It was reported also, in 1750, as occurring in the County of Cork in terms sufficiently clear. Dr. Smith, in his History of that county, writes (p. 345), "*Cedicnemus*, Stone Curlew: the feathers and feet resemble those of a Bustard, and its cry is something like that of a Green Plover (*C. pluvialis*). We have it on our shores."

† The names of these islands, with their respective areas, are given in a footnote, p. 153.

The Crane (which, in the time of Giraldus, was so numerous in Ireland that flocks of a hundred and more might often be seen) is included as a bird of passage with the remark that "during the great frost of 1739 some few Cranes were seen in this county, but not since, or before, in any person's memory."

In Smith's 'History of Cork' will be found a Catalogue of the Birds observed in this county (pp. 325—354). "For catching Larks," the author says, "the Hobby is let fly, and soars in the air above them; the Larks, spying their mortal enemy, lie flat on the ground, and so are easily taken in nets drawn over them. This sport is called 'daring of Larks.'" It is often mentioned by old writers, and is referred to by Shakespeare. The sport is doubtless of some antiquity; but it should be noted that Dr. Smith does not affirm that it was practised in the County of Cork, or indeed in any other part of Ireland, where, according to recent observation, the Hobby is an extremely rare bird. The Goshawk is included and described (p. 327), although, according to Thompson, it cannot with certainty be included in the Irish fauna.

The Common Brown Owl is also included (p. 328) as well known, feeding on mice, and in the evening destroying rabbits; although Thompson states that, if included at all in the Irish fauna, it must be considered extremely rare. Dr. Smith nevertheless distinguishes the sexes of this bird, describing one as brown, the other grey.

The Heath-cock, or Black-game or Grouse, *Tetrao, seu Urogallus minor*, is noticed as "frequent, and needs no particular description. It inhabits mountains, and is rarely seen in lower heath grounds. The cock is almost black, but the female is coloured like a Woodcock or Partridge." This description, as remarked by Thompson, would be decisive as to the species if taken from native birds, but it appears to be borrowed from Willughby.

Three species of Wild Pigeons are recorded as occurring in the County of Cork, including the Stock Dove, *C. aenas sive vinago*, although Thompson believed it to be unknown in Ireland. It is included by Dr. Rutty, however, in his 'Natural History of the County of Dublin,' to which work we shall have presently to refer, and of late years it has certainly been proved to be at least an occasional visitor to Ireland. Lord Clermont, for instance, has recorded its occurrence in the County of Down in October,

1875 (Zool. 1876, p. 4798). There is a specimen, too, in the Belfast Museum, which was shot also in the County of Down, and presented by Mr. A. O. D. Taylor, of Belfast, in 1876; and a young bird, shot after it had left the nest, was obtained by Mr. Darragh for the Belfast Museum.

In 'The Ancient and Present State of the Co. Kerry' we find but a brief chapter (Chapter xiii.) devoted to an account of the fauna, for the reasons thus stated in the opening paragraph:—"Having in some former volumes given a detail of the several species of fish and fowl that are to be met with in the southern parts of this kingdom; as this county is contiguous to those already described, it is frequented by almost the same kinds of both; therefore to avoid a repetition of what has been already treated of at large, I shall refer the reader to Chap. v. and vi. of the 4th book of the Natural History of Cork, as also to pages 259 and 335 of that of Waterford. All that I shall add here will be an account of some peculiar species not observed in the above-mentioned counties, with some curious particulars relative to their natural history, either new or not touched upon in the said tracts."

Then follow some brief remarks on the habits of the common Seal, the Cuttle, and common Crab, and a reference to the only bird which the author considers to be peculiar to the County of Kerry, which, from his description, appears to be the Storm Petrel, "an inhabitant of the Blasquet Islands."

Dr. John Rutty's 'Essay towards a Natural History of the County of Dublin' (2 vols., 8vo, 1772), may be said to mark a new era in the Annals of Irish Zoology by the methodical and systematic way in which his observations are recorded. The four chapters at the end of the first volume (pp. 263—392) deal respectively with the Quadrupeds, Birds, Fishes, and Insects, which at the date of publication were regarded as indigenous to the County of Dublin, and contain several passages worth noting.

"The Stag, Hart, or Red-deer is found here, although much rarer than the *Cervus platyceros*, the Buck, or Fallow-deer, whose horns are palmated."

It would have been desirable to know in what particular parts of the County of Dublin the Red-deer was to be found in Dr. Rutty's day, and whether in a wild state or only in parks.

"A vulgar error," he says, "has prevailed, mentioned in Johnson's 'Historia Animalium,' that the Dormouse is not found in Ireland, nor could live in houses built of Irish oak, which is equally fabulous with what is related concerning the antipathy of the Viper to Irish wood" (p. 277). But Dr. Rutty by no means disproves Johnson's statement, nor adduces any evidence of the existence of the Dormouse in Ireland.

"The Marten, or Marteron, *vulgo* Martin, is found at Lutterelstown. It destroys rabbits and poultry, and is almost as mischievous as the fox" (p. 281). The Weasel is included with the remark, "It may be very useful, as it kills rats and mice better than cats do" (p. 283); but as the Stoat is omitted, and no sufficient description of the animal called Weasel is given, it is possible that the Stoat may be the species referred to.

"The Frog was brought into this kingdom A.D. 1699 by Dr. Guithers" (p. 290).

"The Squirrel is said to have been found in the wood at Lutterelstown. The skins dressed with the hair are much valued as furs for their warmth and fineness of their touch" (p. 291). "The Badger, Gray, Brock, or Bawson," is mentioned as a native of the county (p. 291). Only one species of Bat is included (p. 293), and that not identified. In all probability the Common Pipistrelle.

The Birds of Ireland having been so thoroughly dealt with in the well-known work of Thompson, who naturally availed himself of Dr. Rutty's labours, so far as seemed to him desirable, little need be said here by way of comment. Attention, however, may be directed to a few species which are included by Dr. Rutty as found in the County of Dublin, and yet by no means generally admitted to be indigenous to Ireland. Of these may be named the Black Grouse (p. 302), Red-legged Partridge (p. 303), and the Stock Dove (p. 305).

The Magpie, which, according to Giraldus, as above noted, was in his day said to be unknown in Ireland, is included by Dr. Rutty amongst the Birds of the County of Dublin (p. 308), but with this remark:—"It is a foreigner, naturalised here since the latter end of King James the Second's reign, and is said to have been driven hither by a strong wind."

A noticeable feature in this catalogue of birds is that in almost every instance the food of each species is specified. Four

folding plates are given, on which are figured (1) the Ringed Plover and Snow Bunting, (2) the Whitethroat, (3) the Widgeon and Easterling, (4) the Little Grebe.

From the description given, the Easterling of this author is apparently the Gadwall, and if so, it is remarkable that this bird should be found so far to the westward as the County of Dublin. Thompson, who considers it a rare species in Ireland, does not notice this passage.

The account which follows of the Fishes is equally methodical, if not quite so accurate, but it appears to be derived in a great measure from the Histories of Down, Cork, Kerry, and Waterford, already noticed.

In the Appendix to a 'Statistical Survey of the County of Down,' by the Rev. John Dubourdieu, 8vo, Dublin, 1802, will be found (p. 312) "Some Notice respecting the Natural History, ancient as well as modern, of this County." It extends, however, to only half-a-dozen pages, and, with the exception of some remarks on the fossil horn of the Great Irish-deer, appears to have been chiefly compiled from Harris's 'History of Down,' before noticed.

'A Statistical Survey of the Co. Antrim,' by the same author (Dubourdieu), published in two parts, 8vo, Dublin, 1812, contains, in the first part, a section (pp. 113—126) on the Fishes of Lough Neagh, including the first definite notice of a charr-like fish in Ireland. This fish, there called the Whiting, is identified as *Salmo alpinus*, but as, in the opinion of Dr. Günther, the description does not give any specific characters, we are left in doubt as to the correctness of the determination. It is probable that the Whiting of Lough Neagh is now extinct.*

Another section (pp. 126—128), relates to "the Birds which either live about Lough Neagh, or frequent it in their passage."

The "Grosbeak (*Loxia*)," therein mentioned as being "like a green Linnet but larger," and "often resorting to the wooded farms in its neighbourhood in winter," is most likely not the Hawfinch, but the Crossbill. "The Jay," it is said, "was much more frequent before the woods at Portmore were cut; it is still, however, to be met with about Shane's Castle, and other woods

* Cf. Günther, 'On British Charrs,' P. Z. S., 1862, p. 42.

at the borders of the lake." "Pheasants were formerly numerous at Portmore; now, I believe, they only exist at Shane's Castle and its immediate vicinity." "Wild Turkeys are now nearly extinct, though once in such numbers at the former place; the breed the true copper-colour, with red legs."

It seems to have been formerly the fashion to introduce and preserve Wild Turkeys for the sport of shooting them.*

The next work on our list is M'Skimin's 'History and Antiquities of the County and Town of Carrickfergus,' 12mo, Belfast, 1811. In the Appendix to this little volume will be found (pp. 173—183) a "List of fish found in the Bay of Carrickfergus," together with lists also of the Crustacea and Mollusca. At pp. 196—203, we find a "Catalogue of the most remarkable Birds observed within the County of Carrickfergus." In this Catalogue the Magpie and the Partridge, which were stated by older authors to be unknown in Ireland, are here noted as common.

In the more important quarto of the Rev. George Sampson, entitled 'A Memoir explanatory of the Chart and Survey of the County of Londonderry,' 1814, we find "A Catalogue of some of the Birds observed in Londonderry" (pp. 171—177), amongst which the Kite is noted as "frequently seen hovering over poultry." The Brown or Tawny Owl, considered by Thompson as extremely rare in Ireland, is characterised as commoner than the White Owl. The Magpie is said to be "very common and destructive to young poultry, eggs, &c. Imported from England not one hundred years, now a common nuisance, and instead of being solitary, is becoming gregarious." The Partridge also, at this date, is said to be "common and well known."

The most remarkable statement in this Catalogue, perhaps, is that which refers to the Great Auk:—" *Alca impennis*, Pinguin; on steep rocks sometimes; more frequent near Hornhead, in Donegal County." The author does not explain how a bird which is *impennis* contrives to surmount steep rocks, and his statement reminds us of the equally curious one made by Temminck concerning this same bird, which he asserted retired to breed "upon the banks of Newfoundland," or, in other

* See Gilpin's 'Forest Scenery,' vol. ii., p. 74; and Jesse's 'Gleanings in Nat. Hist.,' 1st series, p. 147.

words, under water !* The "Penguin" referred to is in all probability either the Razorbill or the Guillemot ; notwithstanding that the author, at the end of his list, remarks, "There are doubtless many other birds. I mention only such as I have myself observed"—seventy-eight species in all.

Of the "Fishes observed on the Coast and in the Rivers of the County of Londonderry," a systematic list of nearly fifty species is given (pp. 178—181), with observations, as in the case of the birds, and a figure of the Opah, or King-fish (*Lampris luna*) is given as "the only fish of this species which has been known to be taken on the Irish coasts."

"Among the quadrupeds which formerly existed, but are now extinct (says the author), is the native Stag or Red-deer. The moose-deer is only claimable to these regions by the discovery of his horns in our bogs ; † the wolf is happily no more ; and even the fox is gradually withdrawing from the haunts of man and his vigilant satellite the dog. Neither have we moles, serpents, nor toads, but the frog, who not one hundred years ago was (with the Magpie) imported in a luckless hour, has, like his fellow-voyager, multiplied exceedingly to our discomfort. The otter is yet discoverable, though not common : the marten still more rare ; the weazel is frequent, but here, as elsewhere, leaves it doubtful whether he is to be ranked with the workers of good or evil. Had his antipathy to the Norway rat been more active he might have preserved the black natives, now almost, if not entirely, extinct. With the mischievous domestic mouse, and the inoffensive shrew-mouse, I may close this catalogue of our natural and adopted quadrupeds."

The information here given respecting the fauna of Londonderry is much the same as will be found in the 'Statistical Survey' of that county, published by the same author in 1802.

Of the limited number of works relating to the fauna of Ireland which have been published during the last forty years, it will suffice to mention only the titles, since they are doubtless

* It would perhaps be more correct to characterise this statement as "attributed to Temminck," since we have been unable to verify it.

† A fine pair of horns of the true Elk (*Alces*), discovered at Dardistown, near Drogheda, Co. Meath, are described and figured by Dr. Molyneux in 'Boate's Natural History of Ireland.' Others found in the Co. Tyrone were described by Thompson, P.Z.S., 1837, p. 53.

sufficiently well known. Taking them in the order of publication we have :—

1845. Harvey, J. R. Contributions towards a Fauna and Flora of the County of Cork, read at the meeting of the British Association held at Cork in the year 1843. The Vertebrata by J. R. Harvey; the Mollusca, Crustacea, and Echinodermata by J. D. Humphreys; the Flora by Dr. Power. 1 vol., 8vo. Cork and London.

1846. Richardson, H. D. Facts concerning the Natural History of the gigantic Irish Deer. 8vo. Dublin.

1849—56. Thompson, W. The Natural History of Ireland. Vols. I.—III., Birds. Vols. IV., Mammalia, Reptiles, Fishes, and Invertebrata. 8vo. London.

1853. Watters, J. The Natural History of the Birds of Ireland, Indigenous and Migratory. Post 8vo. Dublin.

1880. Patterson, R. L. The Birds, Fishes, and Cetacea commonly frequenting Belfast Lough. 8vo. London and Belfast.

To give a complete list of the various papers relating to Irish zoology, which may be found scattered throughout the pages of scientific journals, need not here be attempted. It will suffice for our present purpose if we indicate the names of the journals in which they may be found. These are :—

The Transactions of the Royal Irish Academy. 4to. Dublin. 1787 to date.

Proceedings of the Royal Irish Academy. 8vo. Dublin. 1837 to date.

Journal of the Geological Society of Dublin.

Journal of the Royal Geological Society of Ireland.

Proceedings of the Natural History Society of Dublin.

Proceedings, Dublin University Zoological and Botanical Association.

Journal of the Royal Dublin Society.

Proceedings of the Belfast Natural History and Philosophical Society.

Loudon's Magazine of Natural History.

Magazine of Zoology and Botany.

Annals of Natural History.

The Zoologist.

Doubtless there are other periodicals in which papers relating to the fauna of Ireland may be found, and it is almost superfluous to name the Transactions and Proceedings of the Royal, Linnean, and Zoological Societies, which would of course be consulted by any one seeking information on such a subject.

It will be gathered from the foregoing remarks that there are comparatively few works of real value relating to the fauna

of Ireland, by far the greater number of those which we have mentioned being more curious than useful.

In searching for reliable information on any point connected with Irish zoology, most people would probably content themselves with referring to the works of Harvey, Thompson, Watters, and Patterson, and to the various papers by Sir James Wilde, Prof. M'Coy, Dr. Carte, Dr. Ball, Dr. Scouler, Prof. Leith Adams, Messrs. A. G. More, Warren, Barrington, Freke, and other good observers in Ireland which have been published in the various scientific periodicals above named. But something more than this is required. The standard work of Thompson, published a quarter of a century ago, now stands in need of revision and emendation; while most of the scattered papers to which we have referred may be said to be practically inaccessible to most people. A reference to them at least is attended with considerable trouble and inconvenience. We stand sadly in need of a good modern comprehensive work on the fauna of Ireland, and one cannot doubt that the appearance of such a work would be hailed with satisfaction by the large and ever-increasing body of British zoologists.

The question is one which, as it seems to us, might well be dealt with by the British Association. Considering the success which attended the efforts of the Irish Physico-Historical Society made in the same cause more than a century ago, with slender means and far fewer facilities than now exist for the prosecution for scientific research, it cannot be doubted that a far greater success would be achieved at the present day if some scheme for the investigation of the fauna of Ireland were carried out under the auspices of the British Association for the Advancement of Science. It would not be difficult to appoint for the purpose a committee of specialists, and place a fund at their disposal for three years. In that time it would be possible to collect and arrange materials for a practically exhaustive work on Irish Zoology—a work which, as we have said, is much needed; would redound greatly to the credit of the British Association; and relieve British naturalists of the reproach under which they remain of knowing less of the natural productions of their own country than they do of those of the antipodes. This suggestion is respectfully offered for the consideration of those whom it may concern.

ORNITHOLOGICAL NOTES FROM EAST NORFOLK.

BY J. H. GURNEY, JUN., F.Z.S.

IN his "Notes on the Food of Birds," my friend Mr. Norgate, referring to the larder of the Red-backed Shrike, notices four species of bumble-bee which he has found impaled by this bird. To these I am able to add two more. We have this year been fortunate enough to have two pairs of Red-backed Shrikes at Northrepps, and each pair had two nests. I was very anxious to find their "larder" as soon as I heard of them, and the search has been carried on with great zeal. Fourteen bees were found, from the largest "bumble" down to *Bombus elegans*. These were kindly identified for me by Mr. J. B. Bridgman, of Norwich, as *B. subterraneus*, *B. leucorum*, *B. virginialis*, *B. elegans*, *B. hortorum*, and *B. lapidarius*—all females. Mr. Bridgman does not think this shows any partiality in the Shrike for female bees, except that the females being heavier and slower flyers are consequently more easy to capture. It is worthy of remark that both Mr. Norgate's specimens and mine were all identified as females. The bees were nearly all stuck upon dead thorns, such as are used to mend weak places in a hedge; whereas a Shrew-mouse and a young Yellowhammer were impaled on the wild plum or sloe-bush, and so firmly rammed down that the thorns projected through their bodies more than an inch. It is curious how little I can find on the subject of the Red-backed Shrike's larder in our works on Ornithology. I had always supposed that when a spot had been chosen all the prey was impaled there. But this is not the case; the Shrike will garnish a hedge a quarter of a mile from its nest, and not be constant to the same spot for two days, as I have found in the case of the nests in this parish.

On June 17th Mr. Norgate and I found a Greater Spotted Woodpecker's nest, containing young, in a birch tree on the edge of a sheet of water known as Bluestone. The trunk of the tree, and of several neighbouring trees, was covered with scratches made by the claws of the Woodpeckers, for the most part parallel lines of various lengths, from two to four in number. I afterwards found several birch trees scratched and lined in the same way by the Green Woodpecker at Northrepps. The pond at Bluestone is a great asylum for the Reed Warbler, and as the reeds

are not very high in the middle of June, I found without much difficulty six nests, and a few days afterwards Mr. Norgate, going again by himself, found eight; and all this in a compass of half an acre. To any one who does not mind wading, the Reed Warbler's is the easiest of nests to find, and I suppose for that reason it is selected by the Cuckoo to lay its egg in. On one occasion a young Cuckoo was seen by Mr. Norgate being fed by a Thrush near the reeds at Bluestone, and which had doubtless been hatched by Reed Warblers, and flown away from its foster-parents. I believe that instances of this kind frequently happen. Is it as well known that the young Cuckoo sometimes puts itself into the most extraordinary passion, darting at everything that approaches the nest of which it is the occupant? A young Cuckoo at Sprowston, the occupant of a Pied Wagtail's nest, behaved in the most ferocious manner, and we could not conjecture the motive. Our adult Cuckoos were as usual the first of migratory birds to leave us; many young ones generally remain late, and when strong on wing are mistaken for Sparrowhawks.

I found a nest of the Teal in the spring at Hempstead; and, with reference to Mr. Hewett's note on the subject of the lining, I may remark that the old birds had employed down almost entirely, and certainly I did not see any feathers. It was a beautiful structure, deposited in the snuggest way in a bed of heather, slightly arched over with the common fern, and an aperture left for egress. The hen bird sat like a stone, and we almost trod on her. We almost always have one nest there, but I believe never more. Ducks and Teal remain longer at Hempstead than they do at the Broads; and the 1st of August, when our close-time ends, is not too late for the "flappers" at Hempstead.

We had a decided migratory arrival of Sparrowhawks in the middle of August. One dashed itself against a window, attracted by a Canary, and three or four were often seen in a day, where it is rare to see one at any other time. The Northrepps gamekeeper took four in about a week in a very ingenious net, which I recommend to any one who does not wish guns to be fired near the Pheasants' coops. It is quite a small affair, about six feet broad, hung up lightly in a path or "drive" in the wood. Whatever comes in contact with it brings it down directly, and although a few unfortunate Cuckoos and other birds are occasionally caught,

yet as they are always found alive they can be set at liberty. To show how small an aperture a Sparrowhawk can get through, I will just mention that I took a young male out of this net, and with great difficulty squeezed it into the "boot" of a dogcart through a space exactly two inches and a half wide, meaning when I got home to pinion it and turn it out in the kitchen-garden, but it was out and gone in a second. I should not have thought it possible it could have escaped through so small an opening; but since one of them forced its way into a certain bantam-house at Northrepps I have believed these birds can get through anything.

A short time ago, when fishing on one of our Broads, I was witness of a fight between a Marsh Harrier and some Herons. It began by the Marsh Harrier mobbing a Heron: at this juncture eleven other Herons appeared on the scene, and the Harrier beat a retreat, while the Heron it had been hunting did the same, with outstretched neck and in a great fright still. I should be curious to know if the Herons were really a reinforcement to their brother in difficulties.

I saw a Peregrine Falcon flying over Norwich on September 15th. An adult Common Buzzard was taken on a post-trap at Northrepps on September 27th, and being not much hurt was put in a cage and is doing well.

A migration of Buzzards occurred at Yarmouth the third week in September, and most of them were obtained in very curious ways. Mr. A. Patterson writes to the 'Eastern Daily Press,' under date of September 24th:—"A striking fatality has overtaken many birds of the raptorial genus, evidently migratory birds *en route* for this country. Slipping on to the beach this morning I was surprised to find here and there the carcasses of several of these; opposite the Aquarium I picked up three dead Sparrowhawks. In the crop of one I found the eye, pieces of flesh, and a few small feathers of a little bird; the others were empty. A Sparrowhawk was picked up exhausted in Row 51; it was stunned from striking a lamp in that yard. This was on Thursday evening at about nine o'clock. Farther north of the Aquarium I observed three Common Buzzards, a Razorbill, and a headless mangled carcass of a bird which I concluded to be a Marsh Harrier." Another Buzzard was caught alive in the town and taken to Mr. G. Smith on the 24th, who thinks it struck the

light on the Sailors' Home. Besides these Mr. Lown, the bird-stuffer, told me he had received or heard of seven others.

That some of these birds were the Honey Buzzard is likely enough, for we have had a migration of them also. It is impossible, without seeing them, to be sure of correct identification in every case; but there have been seventeen Honey Buzzards, for certain. As previous experience would lead us to expect, the two other species having been plentiful, not a single Rough-legged Buzzard occurred. The Honey Buzzards seem generally to have been trapped at wasps' nests. One taken alive at Southrepps which was thus caught had, in the process of demolishing the wasps' nest, scooped out a hole big enough for it to get into. The man who took it told my father it came back to the hole seven or eight times before he thought of putting a trap down. Another was described to me by a keeper as rising from a wasps' nest, which had the appearance as if a dog had been scraping at it. On going to look at the place a few days afterwards I found the Buzzard had been again, and made a hole nearly a foot in diameter, revealing all one side of the wasps' nest. The keeper believed it had been every morning, as he had watched the hole getting bigger and seen the Buzzard near it. We refrained from the temptation of putting a trap down. The scale-like feathers between the eye and the beak are an excellent protection from wasp-stings and a good mark of distinction between this species and the other Buzzards. We have three of these Honey Buzzards alive, and I look forward with much interest to watching the gradual change in their plumage; they are all very different at present. I have not heard that this arrival of Honey Buzzards has yielded one of the beautiful white varieties occasionally got, of which two Norfolk specimens are figured in the first volume of 'The Zoologist' (1843, p. 377), nor a single ash-cheeked adult.

I have been two or three times lately to Breydon "broad," near Yarmouth, and have seen and heard of several birds there, the chief of which have been a Sandwich Tern, three Kentish Plovers, one Temminck's Stint, two Red-necked Phalaropes, and three young Gadwalls. These last I did not see, but I believe there was no doubt about them: they were very tame, and were with an old drake which escaped. The man who shot them sold them to a poulterer named Thomas at the price of ordinary Wild Ducks, and as such they were hung up in his shop, but some of

the Yarmouth naturalists found out what they were. On the 29th a drake in change was shot at Buckenham, which I saw before it was skinned. There is an element of doubt about all these Gadwalls, as Lord Walsingham and Mr. Fountaine keep a stock in West Norfolk, the produce of tame birds, which are now thoroughly established and able to take care of themselves.

On September 6th I shot five Little Stints out of a flock of about twice that number on the Breydon broad, and some young Pigmy Curlews, which appear at this particular season to be equally common with Dunlins, from which they are easily recognised at a great distance by their slightly larger size. A young Red-necked Phalarope, now in my collection, had been shot on the 4th, which, considering that five shots were fired at it, was not as much spoilt as might have been expected. It was taken to Mr. Lown, the birdstuffer, who had another in, shot at Hopton, near Yarmouth, on the 30th.

On the 24th a Grey-lag Goose was shot by a boatman named Gibbs, and others are reported by Mr. Smith as brought to him on the same day. I saw six Wild Geese flying over Sprowston on the 22nd, and thought it early for them. On the 26th I shot a Greenshank. I may here mention a Smew, in my possession, killed on the Broad on the 15th January, which has partially, but by no means entirely, assumed the white garb of an adult. An adult female was killed with it (ascertained to be so by dissection), which has black cheeks, which used, before the subject was worked out, to be supposed to be the mark of a young male. Another female killed four days later, and sexed by dissection, has no black at all on the cheek, and is no doubt the younger bird of the two.

OCCASIONAL NOTES.

ICELAND FALCON IN IRELAND.—Of the two Gyrfalcons, the Greenlander (*F. candicans*, J. F. Gmel.) has several times been captured in Ireland, and we have in this Museum the very specimen which was killed many years ago at Belmullet, Co. Mayo, as already noticed by my friend Mr. Warren in 'The Zoologist' for 1877, p. 234. But the scarce Icelfalcon (*F. islandus*, J. F. Gmel.) is only very dubiously included by Thompson, and is altogether omitted as an Irish bird by Watters, and in Prof. Newton's

edition of Yarrell. I have therefore much pleasure in placing upon record, as Irish, an indubitable specimen of the Iceland Falcon, which belongs to Mr. Henry J. Richards, of Barnagh, Belmullet, and was shot, as Mr. Richards informs me, by his brother-in-law, in September, 1879, at Tarmoncarra, three miles from the town of Belmullet. The bird was sent to Dublin at the time, and set up by Mr. Williams, to whom I feel much indebted for the information, and I am still more obliged to Mr. Richards, who was kind enough to send his bird for examination, and to allow it to remain as a loan in this Museum. It is remarkable that both species of Falcon should have occurred in the same neighbourhood, and I may add that my friend Capt. Boxer, of the Irish Lights Office, tells me that of late years he has heard of more than one large white Falcon occurring on the north-west coast of Mayo.—A. G. MORE (Museum of Science and Art, Dublin).

ORNITHOLOGICAL NOTES FROM SALISBURY.—On the 1st May, 1879, I noticed a full-plumaged Pied Flycatcher, a male bird, on my garden-gate. It was wonderfully tame, and I could easily have procured it, as it was about the Vicarage garden and grounds most of the day. It moved on, however, and I saw no more of it. Its black and white plumage is so striking that the most unobservant person could scarcely see one without noticing it. On February 21st or 22nd, 1881, I saw a fine Great Grey Shrike in an orchard close to the house, between here and Salisbury. I was attracted first by the peculiar motion of its long tail, and as it was the first time I had seen one in its wild state I was much pleased. I watched it for some time, and was within a few yards of it, so that I could observe its actions perfectly. I tried to obtain this bird, but could not hear of it again in the neighbourhood. A nice specimen of each, of the Short-horned Owl and Brambling, were picked up dead in the latter part of last winter, after the heavy snow, and were brought to me. The Brambling was a male bird in good plumage; the Owl was also in good plumage, but very thin. The other day a friend of mine shot and brought to me a very peculiarly marked Jackdaw. It was, however, in full moult, and so, most unfortunately, unfit for preservation. The entire bird would have been of a delicate light silver-grey colour, the new quills being of that tint, while the older plumage was greyish mouse-colour. I had noticed the bird about the Vicarage during the last two years.—A. P. MORRES (Britford Vicarage, Salisbury).

HABITS OF THE STORM PETREL IN CAPTIVITY.—During the recent gale (October 14th) a Storm Petrel was picked up alive at Cardiff, and taken to Mr. Drane, of Queen Street, who succeeded in keeping it alive for a week, when it died. I send you an account of the bird which he wrote for the 'Cardiff Western Mail' of November 1st:—"I received it in a condition of extreme exhaustion, and thought it could not survive the day. It was

placed in a box containing about seven pounds of hot sand covered with some folds of a soft woollen stuff, and fed at frequent intervals with morsels of fish dipped in cod-liver oil, cod-liver oil alone, brandy and milk, cream, chewed bread and butter, bits of beef-fat, and raw meat. It would submit to be forcibly fed with solids, but rejected liquids with apparent aversion, and revived considerably; so that it would seek for food, and take it from the hand. It never appeared at all wild, timid, or spiteful, was exceedingly fond of warmth, would nestle in the hollow of the hand, settle itself to sleep there, and remain quiet as long as permitted to do so. When allowed its liberty in the room, it would flitter about the floor for a time, with a singular gracefulness, but would ultimately settle as near the warm fender as it could get, twice got within it, and seemed very happy there. Placed in a large bath, it showed an entire incapacity to use its feet for swimming like other web-footed birds, and its plumage, like theirs, instead of repelling water, became saturated at once. Its feet never moved in concert—expanding and closing, as a duck's would do, but, on the other hand, it was evidently distressed, and not in its element. When removed from the water it was so wet, even its wings, that it was quite helpless. I was so surprised at this that, a few days afterwards, I repeated the experiment, that I might not be misled by too hasty a conclusion. The result was the same, and my observations so confirmed as to lead me to the conviction that these birds never take the water like ducks, gulls, grebes, &c., and that being forced into it by accident they would be quite unable to extricate themselves, and would perish as certainly as any land bird. I have no opportunity of speaking upon actual measurement, but should say its gape is not larger than the common Martin's, but it was capable of a dilation sufficient to enable it to swallow with ease pieces which would strike one as very much too large for it. As it seemed to dislike liquids, I soon discontinued my attempts to feed it with them, except oil; and twice, long afterwards, I saw it forcibly eject a watery fluid, free from grease, from its nostrils, as if from a syringe, though the quantity was not more than a small drop. Does this justify the conjecture that watery liquids are so little necessary to its economy that it is provided with this faculty in order to rid itself of any superfluity? It has a habit of climbing by its hooked bill and wings, using the wrist, or carpal joints with the effect of hands; the feet are used at the same time, but play a subsidiary part. When at liberty in the room, to interpose an impediment to its progress was to excite a determination in this way to surmount it, when, with a tenth of the effort, it could have gone round it. Its habits were distinctly nocturnal, beginning to be lively in the evening and remaining restless all night; whereas it would be quiet or sleep the greater part of the day, especially if near the fire or on hot sand. It did not once utter any sound, and I never saw it put its head under its wing in sleep. It tucks its feet up in its feathers, just as a swan

does when sleeping afloat, and, lying then close to the ground, rests the tip of its bill upon it, straight in front. It would flutter about the room in a manner suggesting a child's first efforts to walk, carrying its wings extended and erect over its back, so as to assist its progress, just as if it was not sure of its feet, or not quite accustomed to their use. This elegant movement shows how it would *tread* the surface of the water, in its search for floating food, while its wings supported it sufficiently to prevent immersion."—MURRAY A. MATHEW (Stone Hall, Haverfordwest).

PETRELS ON THE LINCOLNSHIRE COAST.—Three specimens of the Fork-tailed Petrel, *Thalassidroma leucorhoa*, were caught on the night of October 24th in flight nets on the salt-marshes near Friskney, and sent to me in the flesh—two females and one male. At the same time a pair of Storm Petrels, *T. pelagica*, were taken in the same manner. This locality is rather remarkable for the occurrence of the Fork-tailed Petrel, for I have on previous occasions received others from there, and heard on good authority of its occasional appearance there. I have myself seen the bird flying over the sea-banks there after an exceptionally stormy night, and I should attribute the appearance of the subjects of this notice to a similar cause. Mr. Dresser, in his 'Birds of Europe,' mentions the west coast of England as being most frequently visited by this species; but as far as my experience goes, the coasts of Lincolnshire and Norfolk have furnished a much longer list of specimens taken.—CHARLES DIXON (Tenterden Street, W.).

RARE BIRDS IN SUSSEX.—During the month of September, and early part of October, two Little Stints, *Tringa minuta*, and two Curlew Sandpipers, *T. subarquata*, were shot in the Pevensey marshes; another *T. minuta* and three *T. subarquata* were obtained near Rye. On Sept. 27th a Common Buzzard, *Buteo vulgaris*, was brought for preservation to Mr. Bristow, of St. Leonards-on-Sea; it had been shot the day before at "The Grove," Hollington, not more than half a mile from the town. Mr. W. B. Young, on whose property it was shot, informed me that another was seen the next day, and a week or so afterwards three more were seen. I see Mr. Harting, in his 'Handbook of British Birds,' referring to this species says, "Migrates to the east and south-east in autumn." About ten days ago I saw at Messrs. Pratt's, Brighton, a fine dark-plumage male Honey Buzzard, *Pernis apivorus*, which had been shot by Mr. H. Langton, and taken there for preservation. [This bird was killed in Hertfordshire; see p. 472.] Mr. Pratt also informed me that another dark-plumaged female of this species was caught at Robertsbridge on October 2nd; and another one was taken at Balcombe a few days before; this latter was a male, and had been feeding on wild bees and their larvæ, its throat being full of them. Another *P. apivorus* was obtained at Birch Grove, near East Grinstead,

and was sent to Mr. Max, taxidermist, of that town, for preservation; the bird when first seen was apparently digging for a wasp's nest; a trap was set by the gamekeeper, and the bird was secured. A Great Grey Shrike, *Lanius excubitor*, was caught at Patcham, near Brighton, on October 15th, and was brought alive to Mr. Pratt, who also received a few days afterwards a fine specimen of the Crested Lark, *Alauda cristata* [recorded by Mr. Borrer, p. 494], and on October 25th, a mature specimen of the Lapland Bunting, *Emberiza lapponica*. Mr. C. J. Ebdon, of Coghurst Hall, near Hastings, informs me that towards the latter end of October he flushed a Great Snipe, *Gallinago major*, in a stubble-field on the Coghurst Hall estate. On the last day but one of October, when shooting in the Walling Marsh, near Rye, in company with Mr. H. V. Chapman, I was told by that gentleman that on the 16th of the same month, when out for a walk in the marsh with his setter, he flushed a Heron from a dyke, and the bird, instead of making off, as is usual, flew round and round his dog, repeatedly striking at its head; the bird, he further added, seemed devoid of all fear, and followed himself and dog for some little distance, frequently coming within a few yards of where he was. Strange conduct, surely, in a bird usually so wild and wary as the Heron; and at this time of the year anxiety for its young could certainly not be pleaded as an excuse for its audacity.—THOMAS PARKIN (Halton, Hastings). [Not unprecedented. See 'Hints on Shore Shooting,' p. 67.—ED.]

SONG OF THE WOODCHAT SHRIKE.—On the 1st of November I first heard the song of the Woodchat Shrike, as uttered by a caged male bird in my possession. The servants, who keep him by the kitchen fire, reported on October 24th or 25th that he was then singing loudly, and continued to report the fact daily until on November 1st I myself heard his well-sustained melody. It is for the most part guttural, but contains some very sweet notes. He has not heard any other bird singing since I purchased him in August last at Geneva. About August 12th he commenced to moult, now three parts completed. His sister nestling died in September without having cast a feather. Her voice did not possess the harsh chuckle or alarm-note of her brother; but rather resembled the wail of a kitten in difficulties, especially if she was hungry, or saw a grasshopper. It may be worth adding that the throat of the Woodchat vibrates very visibly during the performance of the song. At present the bird sings about four times a-day, warbling on each occasion for some minutes. He often holds up beetles in his feet, using those extremities almost as hands.—HUGH A. MACPHERSON (Westbourne Terrace, W.).

BIRDS AND TELEGRAPH-WIRES.—Mr. Corbin's note on this subject brings to remembrance a few instances which have come within my own experience from time to time. Although there is no doubt that migratory

birds suffer most from coming in contact with these obstructions, yet resident species are frequently killed or wounded by flying against them. A few years ago a single telegraph-wire was stretched across the sand-hills to the lighthouse at Spurn, and numbers of *Tringidæ* and other shore-birds came to an untimely end by flying against it; but after the first year or so the number of casualties was very considerably lessened, thus showing that the birds get accustomed to these impediments in course of time and avoid them. I have seen a Turnstone that had one wing completely severed from the body, and have heard of other somewhat similar instances. On one occasion, whilst driving along the Leeds and Wetherby turnpike, a Wood Pigeon flew across the road at a place where it passes through a wood in which these birds nest, and, hitting the telegraph-wires, fell dead by the roadside, and I picked it up; but beyond a few feathers which had been knocked off, the bird showed no trace of the accident. A farmer one day flushed a covey of Partridges, and they flew into the wires, and he secured three of them. I also picked up a Thrush on the same road. About a year ago, when driving into Scotland over Shap Fells by the old coaching road, I noticed that when we reached the summit of the moor, the telegraph-wires, instead of being stretched from post to post in the usual manner, were run in pipes under-ground for a considerable distance. On arriving at the hotel at Shap I was told that this had been done on account of the havoc which the wires when exposed had caused amongst the Grouse. Several other cases of both migratory and non-migratory birds, not having come under my own observation, I will not relate. They were cases of Partridge, Corn Crake, and Woodcock.—J. J. ARMISTEAD (Douglas Hall, Dalbeattie, N.B.).

OSPREY IN CORNWALL.—On October 6th Mr. Pendarves, of Pendarves, near Camborne, shot an Osprey near his ponds. The bird had been observed by him and his keepers for a day or two previously; and an Osprey (probably the same bird) had just before that been seen by Mr. F. V. Hill, of Helston, at Clewance Ponds, about two miles from Pendarves. The specimen, which is a young bird in excellent plumage, is now with Mr. W. H. Vingoe, of this place, for preservation. Mr. Vingoe informs me that on two occasions previously he has observed an Osprey in Mount's Bay; and I myself, some twenty-five years ago, observed a large bird on the surface struggling with something in the water,—probably a fish too powerful for it,—and running my boat down upon it thought it to be an Osprey, but it flew away before I got within shot of it. The struggle took place in water about eight fathoms deep.—THOMAS CORNISH (Penzance).

HOBBY NESTING IN OXFORDSHIRE.—I am glad to be able to record that the Hobby, with us a very rare summer visitant, has twice nested near here of late years. My brother, Mr. O. V. Aplin, has in his possession an

egg taken from a nest at Claydon in 1876, and in 1877 he received a young bird which had been taken from a nest in some high trees near Huscote Mill. He kept this bird alive for nearly a year and a half, when it died, probably from the effect of exposure to the severe cold. When in captivity it showed a decided preference for the internal organs of freshly-killed birds.—F. C. APLIN (Bodicote, Banbury).

CRESTED LARK IN SUSSEX.—On the 10th October a specimen of this bird was caught by a Brighton birdcatcher, at Portslade, a few miles to the west of that town, and taken to Messrs. Pratt, the birdstuffers, where I saw it in the flesh the next day. It is in very perfect plumage, and proved on dissection to be an adult male. It is now in my collection, and as I believe only five specimens are recorded as having occurred in this country, I have thought it worthy of notice.—WILLIAM BORRER (Cowfold, Sussex).

[Seven instances of the occurrence of the Crested Lark in England and Ireland are recorded in the 'Handbook of British Birds' (p. 110), and we are informed by the Rev. Murray A. Mathew that a bird of this species, shot on Braunton Burrows, N. Devon, about the autumn of 1855, is preserved at Tapley Park.—ED.]

JACKDAW *versus* CHOUGH IN KIRKCUDBRIGHTSHIRE.—The Jackdaw is a very common bird, breeding along our sea-coast in considerable numbers. I have authentic instances of the Chough formerly breeding at several stations on our cliffs, but it is now, I fear, quite extinct here. I have never myself seen one, but have met with old inhabitants who remember the "red-legs" very well, and tell me there were formerly plenty of them. Jackdaws have increased in numbers here, and have, I believe, driven the Choughs away; the latter have certainly not been driven away by man. It would be interesting to know if the same has occurred elsewhere. Last spring we had a *pied* Jackdaw, one wing being nearly all white. The bird frequented a sea-cliff within a quarter of a mile of my residence, and I had a good opportunity of watching it all through the season. It paired and bred, but the young were of the usual colour, and at moulting time the white feathers of the adult bird were replaced by black ones.—J. J. ARMISTEAD (Douglas Hall, Dalbeattie, N.B.).

[This return to the normal coloration after the moult confirms the view expressed on cream-coloured varieties (p. 468).—ED.]

GLOSSY IBIS IN HAMPSHIRE.—The specimen of this bird, referred to in your editorial note (p. 469) as having been killed in Hampshire, was shot at Dogmersfield Park, on the 15th September last, by one of Sir H. Mildmay's keepers.—RICHARD HOOPER (Upton Rectory, Didcot).

EARLY APPEARANCE OF THE GREAT GREY SHRIKE.—A specimen of the Great Grey Shrike, *Lanius excubitor*, was shot at Friskney by one

of the coast-guard during the first week of October, and is now, I believe, in the possession of Mr. Hutchinson, of Derby.—CHAS. DIXON (Tenterden Street, W.).

HONEY BUZZARD IN HERTFORDSHIRE.—As an interesting coincidence in connection with the notice (p. 472) of a Honey Buzzard being shot in this county, I may mention that a bird of this species was killed on the same day in this parish, which is about six miles distant from where the previous bird was met with.—J. A. EWING (Westwick Rectory, Herts).

NOTICES OF NEW BOOKS.

The Formation of Vegetable Mould through the action of Worms; with Observations on their Habits. By CHARLES DARWIN, LL.D., F.R.S. Post 8vo, pp. 313. London: Murray. 1881.

THE perusal of a paper "On the Formation of Mould," published by Mr. Darwin many years ago in the 'Transactions of the Geological Society,' has in some measure prepared us for the volume just issued, which may be regarded as an expansion of the former essay. Objections having been taken by continental naturalists to some of the statements put forth by Mr. Darwin in his earlier *brochure*, he resolved to make more observations of the same kind as those he had published, and to carry out some experiments, with a view to ascertain the degree of intelligence possessed by earthworms.

By many people these lowly organised creatures are regarded as too insignificant to be worth notice, and few probably have taken sufficient interest in them to examine their structure and investigate their habits.

The body of an earthworm consists externally of a series of rings, from one hundred to two hundred in number, each having short bristles projecting from it. These rings are well seen in the remains of a worm that has been dried by exposure to the sun and air, when they retain their annular shape, and form a hollow tube. They are connected by a membrane or skin, and are moved by strong muscles contained in their interior. The fore part of the body is tapering, and ends in a mouth with lips. Immediately behind the mouth is the gullet or tube leading

to the gizzard; this swells out into a strong muscular throat or pharynx. On each side of the gullet are glands secreting lime. The gullet itself ends in a crop, which leads into a powerful gizzard: this, like the corresponding organ in a bird, contains stones for grinding the food. These stones in a full-sized worm are so large that nine or ten of them laid side by side will measure a full inch. The intestine passes straight from the gizzard to the end of the body. Worms have no lungs, breathing by their moist skin; hence they rapidly perish when exposed to dry air, though capable of prolonged life under water. Their senses are peculiar. They have no eyes, yet appear sensitive to light, which must pass through the transparent skin to reach the nerves. Thus they distinguish day and night, and avoid the dangers of exposure to their enemies, the birds, during the former period. Sound, unless accompanied by vibration of the ground, produces no effect on them, but they are sensitive of the slightest touch, even of a current of air. Their food is chiefly half-decayed leaves, but they are also carnivorous, and even prey upon the dead bodies of their own kind. The dead leaves they drag into their burrows, partly for food, and partly to close the openings. The leaves are seized by the lips, and then the anterior part of the body is formed into a kind of sucker. When leaves are not to be obtained for food, they swallow large quantities of mould, digesting the vegetable matter, and voiding the mineral portion in the form of worm-casts at the mouths of the burrows.

In plugging up the mouths of their burrows, they evince a remarkable degree of intelligence. In order to test this, Mr. Darwin scattered a few hundred elongated triangles of paper over the ground, after removing all the fallen leaves he could see. These triangles, cut out of writing-paper, were rubbed with raw fat on both sides to prevent their becoming too limp when exposed at night to rain and dew. He found that, in the majority of cases, the worm on seizing a triangle selected the most pointed angle to draw into its burrow; in other words, it seized it in the position in which it could most easily be made to effect the object in view. In considering the question whether such action is intelligent or non-intelligent, Mr. Darwin adopts the argument that we can safely infer intelligence only when we see an individual profiting by its own individual experience; and he adds that if worms are able to judge either before or after

having drawn an object close to the mouths of their burrows, how best to drag it in, they must acquire some notion of its general shape, and thus guide their actions by the result of individual experience.

The enormous amount of earth brought annually to the surface by worms is very remarkable. By actual experiment—that is, by collecting and weighing the castings—it appears that in some cases 83 lbs. of earth are brought up to the surface of every square yard during the year—an amount which reaches the high total of 18 tons per acre; and 10 tons may be taken as a very fair average. The number of worms in an acre of land has been estimated at between 50,000 and 60,000, their weight being nearly 400 lbs. The numerous experiments of this kind made by Mr. Darwin give some very curious and at the same time astonishing results. One of these experiments lasted about thirty years! It was this:—In 1842 a layer of broken chalk was spread over old pasture land for the sake of observing at some future time the depth to which it would become buried. In 1871 a trench was dug across the field, and the line of white masses was everywhere seven inches from the surface!

After such experiments as these, it is not difficult to understand how boulders, monoliths, and ancient monuments, may in course of time become gradually buried by the agency of earth-worms, to whom antiquaries may be said to be truly indebted. The tessellated pavement of Abinger, in Surrey, was covered with at least fourteen inches of worm castings; the remains of a Roman villa at Chedworth, in Gloucestershire, were concealed under thirty-eight inches of similar soil; and the fine villa recently discovered at Brading, in the Isle of Wight, had been buried by worms to the depth of from three to four feet, the floor having gradually sunk as the earth which the annelids piled up was removed by them. In like manner the Roman towns of Silchester, in Hampshire, and Wroxeter, in Shropshire, have experienced the kindly attention of the worms; while one of the fallen blocks at Stonehenge has sunk considerably below the level of the surrounding ground through the same agency.

It must not, however, be forgotten—and Mr. Darwin is careful to remind us of this cause of possible error in his own calculations—that the washing down of soil from the neighbouring higher lands and the deposition of dust have together aided

largely in the work of concealment when the ruins are so placed as to permit of the action of these subsidiary causes.

The assistance which worms lend to the process of denudation is of special importance in the case of flat or gently inclined surfaces, for here it is not improbably the chief agent at work. Castings thrown up during or shortly before rain flow for a short distance down an inclined surface, and the finest earth is washed completely away. Again, during dry weather the disintegrated castings roll as little pellets, and, even on a level field, a strong wind will blow them all to leeward.

In his closing chapter, Mr. Darwin thus summarises the chief benefits confirmed by worms on man as a tiller of the soil. 'Worms,' he says, "prepare the ground in an excellent manner for the growth of fibrous-rooted plants and for seedlings of all kinds. They periodically expose the mould to the air, and sift it, so that no stones larger than the particles which they can swallow are left in it. They mingle the whole intimately together, like a gardener who prepares fine soil for his choicest plants. In this state it is well fitted to retain moisture and to absorb all soluble substances, as well as for the process of nitrification. The bones of dead animals, the harder parts of insects, the shells of land-mollusks, leaves, twigs, &c., are before long all buried beneath the accumulated castings of worms, and are thus brought in a more or less decayed state within reach of the roots of plants. Worms likewise drag an infinite number of dead leaves and other parts of plants into their burrows, partly for the sake of plugging them up and partly as food. The leaves which are dragged into the burrows as food, after being torn into the finest shreds, partially digested, and saturated with the intestinal and urinary secretions, are commingled with much earth. This earth forms the dark-coloured, rich humus, which almost everywhere covers the surface of the land with a fairly well-defined layer or mantle. When we behold a wide, turf-covered expanse, we should remember that its smoothness, on which so much of its beauty depends, is mainly due to all the inequalities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such expanse has passed, and will again pass, every few years through the bodies of worms."

In the face of such testimony as that adduced by Mr. Darwin's untiring industry in this extremely interesting volume, it may

well be doubted whether there are many other animals which have played so important a part in the history of the world as "the poor worm."

Studies in the Theory of Descent. By Dr. A. WEISMANN. Translated and edited by RAPHAEL MELDOLA, F.C.S. Part II. On the origin of the Markings of Caterpillars, and on Phyletic Parallelism in Metamorphic Species. With six coloured plates. 8vo. London: Sampson Low & Co. 1881.

IN the first portion of this work, which is announced to be completed in three parts, Dr. Weismann examined the phenomena of seasonal dimorphism in butterflies; in the second part now before us we have two essays with the titles given above. Of these, the former embodies the details of a careful study of the change of markings which the caterpillars of the *Sphingidæ* undergo in the course of their development. From a consideration of these, the author deduces certain laws of development, which are subject to modification through the influence of natural selection, and the necessity for protection, thus giving rise to the various markings observable in different groups. These varieties of colour and markings in the *Sphingidæ*, according to Dr. Weismann, have a distinct biological value, and can in every case be traced to the action of natural selection and correlation of growth.

In his second essay, the author compares different groups of *Sphingidæ* in their three stages of larva, pupa, and imago, and argues that the modifications which are found to occur are due, not to any innate law of variation and development (which would affect all the stages *pari passu*, and produce "a phyletic parallelism" which does not exist), but to an adaptation to special conditions to which, in one or other of its stages, the insect is exposed. This is stated to be the case not only with Lepidoptera generally, but with all creatures which undergo a metamorphosis.

No one but an entomologist well conversant with German would have ventured on a translation of this very interesting work, for the numerous technical terms which everywhere occur require a translator who has not only a knowledge of the language, but a really thorough acquaintance with the subject matter

of the work. English readers, therefore, who do not, like Mr. Meldola, possess these qualifications, will feel grateful to him for so reliable and well illustrated an edition.

The Spiders of Dorset; with an Appendix containing short Descriptions of those British Species not yet found in Dorsetshire. By the Rev. OCTAVIUS PICKARD CAMBRIDGE, M.A., C.M.Z.S. Edited by Professor JAMES BUCKMAN, F.G.S., F.L.S. Vol. II. 8vo, pp. 236—625. Sherborne: L. H. Ruegg. 1881.

ALTHOUGH professedly dealing only with the Spiders which have been met with in the county in which the author resides, this is in fact a monograph of the British *Arachnidæ*; for about two-thirds of the known British species have been found in Dorsetshire, and the remaining species are now included in an Appendix to the second and concluding part of the work lately issued. We have thus a very complete handbook to the study of a subject which has hitherto had but few votaries, but to which many more doubtless will now turn their attention.

In our notice of the first volume of this work (Zool. 1879, p. 470), we directed attention to the excellent Introduction which it contains, in which the author, after pointing out the difference between Spiders and Insects, describes their external and internal structure, their habits and economy, their snares and mode of entrapping their prey. In the second volume we find some "additional remarks on the senses, habits, and economy of Spiders," in which the general reader will find more to interest him than he will in the scientific diagnoses of species, which occupy the bulk of the work.

"Spiders," says Mr. Cambridge, "undoubtedly possess the sense of sight in a very strong degree; but within what limits of distance, or with what magnifying power, we have very little proof, either from observation or anatomy. It is probable that many Spiders see best with a diminished light, and different powers of vision are attributed to the different eyes, although this has not been as yet completely proved."

The sense of touch, or feeling, is no doubt much assisted by the hairy armature of the legs, palpi, or other parts. Mr. Cambridge thinks it is also probably through these hairs that the sense

of hearing is principally exercised. It is certain that Spiders are very sensibly affected by sound, though whether they are capable of appreciating and discriminating musical sounds, as has been asserted, is more doubtful.

They have most probably a strong sense of taste, which is without doubt seated in the tongue.

With respect to the sense of pain, there seems no reason to believe that Spiders are more susceptible than any others of the *Articulata*, in all of which any sense of acute pain is probably almost or altogether wanting.

Mr. Cambridge has some interesting observations on the power to utter sounds possessed by at least one British species, *Asagena phalerata*, the only one, so far as he is aware, in which this peculiarity has been noticed, although a stridulating apparatus has also been found in a large Indian Spider, *Mygale stridulans*, Wood-Mason.

From the foregoing remarks it will be seen that 'The Spiders of Dorset' is not a mere dry list of species, with technical diagnoses, but contains, in addition to necessary descriptions, much information that will be interesting, not only to those who have made Spiders their special study, but to that larger class of naturalists who, for want of a text-book like that now supplied by Mr. Cambridge, are perhaps as yet imperfectly informed on the subject.

Some more Scraps about Birds. By CHARLES MURRAY ADAMSON. 8vo, pp. 273, with illustrations. Newcastle-on-Tyne : Bell & Co. 1881.

THIS volume may be regarded as a second series of the Notes and Observations on Birds, which, under a somewhat similar title, appeared in 1879, and were noticed in 'The Zoologist' for that year (p. 391). Many of these notes are interesting enough, embracing as they do the results of the author's personal observation of the habits of wildfowl and waders on the shores and estuaries of Northumberland during the past forty years, and his remarks on the seasonal change of plumage which these birds undergo are well worth perusing. But the reader is placed at serious disadvantage owing to the form in which these notes are presented to him. They appear, for the most part, to

be *verbatim* transcripts from the author's journals, printed as they were written, without any order or arrangement, save the chronological order in which they were originally jotted down, and without an index of any kind.

The author tells us in his Preface that "having so many memoranda, and in such various forms, I was quite at a loss in what shape to put them, even for my own reference; I therefore resolved to print them as they turned up, and my inability to arrange them must be my excuse for the unsatisfactory way in which they appear." We cannot admit the validity of such an excuse. On the contrary, bearing in mind the maxim that "what is worth doing at all is worth doing well," we think that Mr. Adamson should have taken the trouble (for that is really what it amounts to) of collecting all his notes upon each species under the head of that species, instead of leaving them scattered throughout the volume; the species might then have been grouped under certain general headings, and a good index would have rendered the volume far more complete and useful than it now is.

It is to be regretted that Mr. Adamson has not adopted some such course as this, for many of his notes are of practical value, and would be useful for future reference if the reader were only enabled to find them again without having to look through the entire volume a second time.

A noticeable and meritorious feature in the book is the number of lithographic illustrations (about forty) with which it is interspersed, from original sketches by the author. Some of these are very characteristic of the species they are intended to represent, and betoken close observation of the attitudes and actions of wildfowl and seafowl as studied in their natural haunts.

A Manual of Injurious Insects; with Methods of Prevention and Remedy for their attacks on Food Crops, Forest Trees, and Fruit. With a short Introduction to Entomology. By ELEANOR A. ORMEROD. Post 8vo, pp. 316, with numerous illustrations. London: Sonnenschein & Allen. 1881.

THE object of this volume is to give a short account of the different kinds of insects, about ninety in number, which attack

wheat and root crops, fruit, and forest trees in this country, and to furnish suggestions for the prevention or remedy for these attacks. Such a manual was much needed, and, written as it is in a plain unaffected style, will commend itself to the most unlearned.

The descriptions of the insects and their habits are briefly and clearly detailed, accompanied in almost every instance by a figure, either from original drawings by the author or reproduced by permission from Curtis's well-known 'Farm Insects.' These illustrations, in many cases portray the insect in its successive stages of larva, pupa, and imago, as well as the appearance presented by its peculiar mode of attack.

The remedies suggested are all based upon experiments made and communicated by trustworthy observers, or taken from previously published information duly acknowledged.

Miss Ormerod has been fortunate in securing the co-operation of numerous well-known entomologists in various parts of the country, who have freely contributed the results of their own observations and experiments *pro bono publico*, and the result is a very useful little Manual.

We will make one suggestion for improvement in a second edition. Two Introductions and a Preface strike us as being rather *de trop*. It would surely be better to let the Preface follow and form part of Introduction No. 1, retaining the title of "Preface" only; and let this be succeeded by the "Introduction to Entomology," the first seven pages of which might be condensed with advantage. Some of the illustrations are good, but many of them are not delicate enough, and would be much improved by the application of less ink and pressure. There is room for some improvement, too, in the Index. As the book is intended chiefly for the use of those who are not professed entomologists, it would be desirable that the Index should in every case contain the common English name as well as the scientific name. We do not find the Yellow Underwing Moth under any of these three English words, nor is it included even under the generic term *Tryphæna*, although described and figured at p. 38, as well as being figured also at p. xxxi of the Introduction.

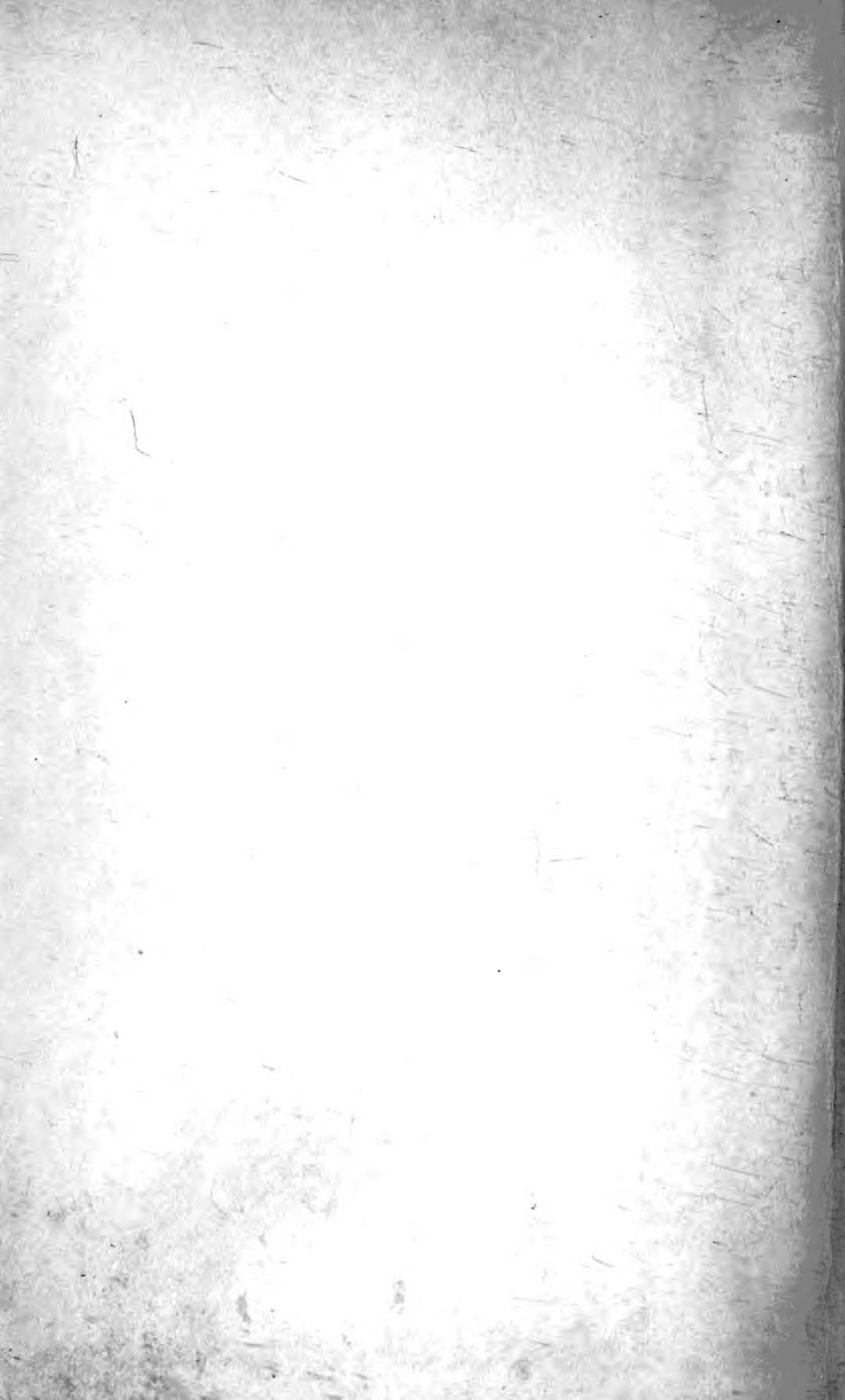
Ought not the larvæ of *Tenebrio molitor*, popularly known as "meal-worms," to find place amongst "Injurious Insects"?—for

injurious they certainly are to flour stores. These larvæ swarm in all places where flour and meal are kept, and often do great damage to biscuits, especially those which are taken to sea.

A Zoological Atlas (including Comparative Anatomy); with Practical Directions and Explanatory Text. For the use of Students. 249 coloured figures and diagrams. By D. M'ALPINE, F.C.S., Lecturer on Biology and Natural History, Edinburgh. (*Invertebrata.*) Edinburgh and London: W. & A. K. Johnston. 1881.

THE first part of this Atlas, containing the *Vertebrata* has already been noticed in 'The Zoologist' (*ante* p. 392). The second part just published deals with the *Invertebrata*, and contains carefully drawn figures of the external and internal structure. This is so much more varied than is the case with the Vertebrates, that the number of typical forms is necessarily much greater. To keep the size of the work within due limits the author has been obliged to make a selection, and has given a preference to such genera as are required for the Practical Examination of the University of London. In that examination not only has the candidate to dissect specimens placed before him, but also to examine and describe *prepared* specimens, and the first four plates in this Atlas may be regarded as preliminary exercise in seeing and describing. They are introduced to show how the lower forms may be studied, and how by the use of what the author calls "Life-History Diagnoses" the student may take in at a glance the chief features of their life.

As regards the explanatory text, the brief introductory description of the animal usually gives those characters which are best observed in the living state, and which show its relations to its surroundings, while the remainder of the text describes the figures, dealing with the various parts of the animal in detail. The clearness with which these details have been drawn renders the Atlas on the whole a useful aid to practical anatomy.



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